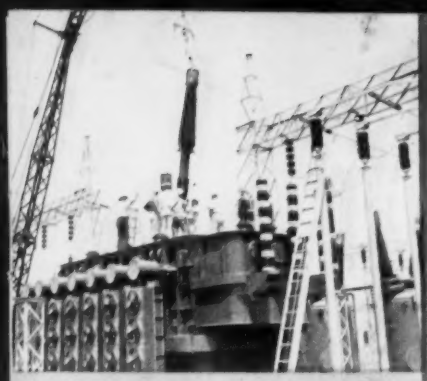

$6.45 Per Kva—Installed 88

Make Engineers More Valuable 100

Light Will Turn Turnstiles 111

New Idea for Cooking Schools 120

ELECTRICAL WEST

May 1957
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

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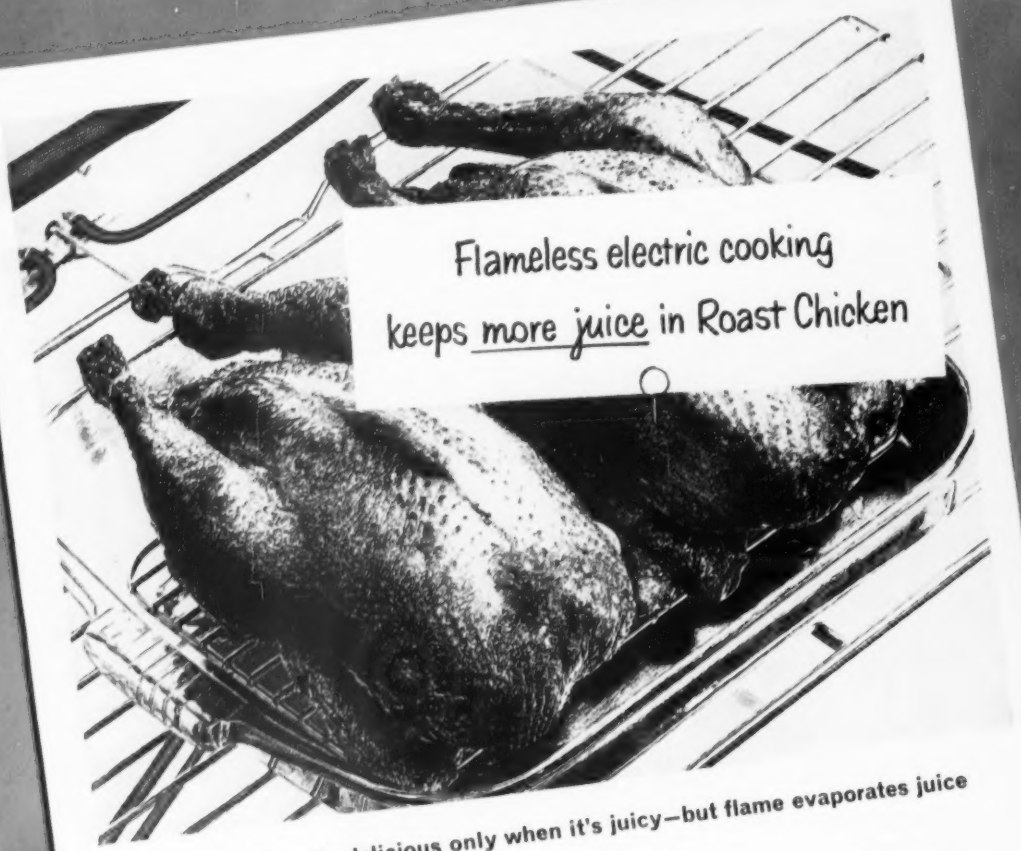
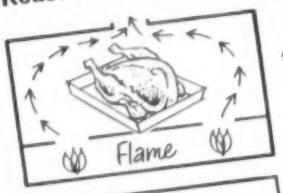
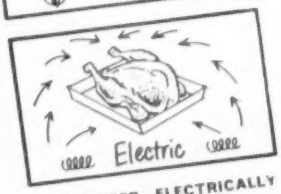


Roast chicken is delicious only when it's juicy—but flame evaporates juice

Here's why:





LIVE BETTER—ELECTRICALLY

◊ **Flame needs air to breathe.** A flame-heated oven constantly inhales dry air, exhales moist air—literally cooks meat in a hot draft that evaporates good juices. But juice is the secret of flavor in meats, and especially in chicken. Nothing is more disappointing than a piece of dried-out white meat. Yet, in a flame-type oven, that's too often exactly what you get.

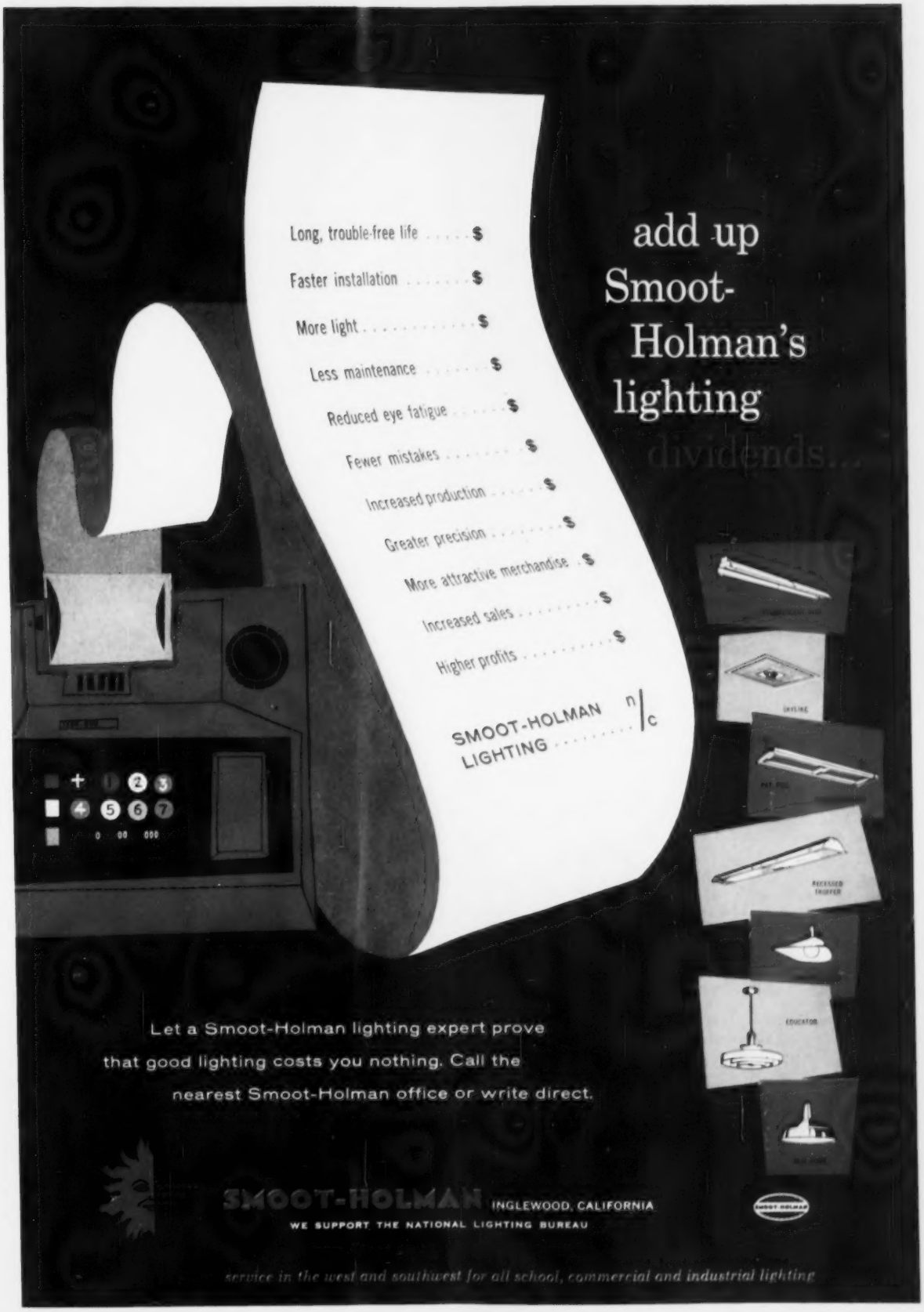
But in a modern electric oven there's no draft of constantly changing air. Because there's no flame. You cook in moist heat, not dry heat. Result? More juice stays in the chicken. And the chicken tastes better.

Electric cooking is cleaner, too. Your pots, pans and walls stay fresh and new far longer. And cooler. Electricity puts the heat in the food, not the kitchen. Actually, it's the *only* modern way to cook. See your electrical dealer soon.

SOUTHERN CALIFORNIA Edison COMPANY

Did you know? Flameless electric cooking costs about $1.30 to $1.50 a month for a family of 4

Edison is selling the advantages of electric cooking— to boost your electric range sales


Long, trouble-free life . . . . . $
Faster installation . . . . . $
More light . . . . . $
Less maintenance . . . . . $
Reduced eye fatigue . . . . . $
Fewer mistakes . . . . . $
Increased production . . . . . $
Greater precision . . . . . $
More attractive merchandise . $
Increased sales . . . . . $
Higher profits . . . . . $
SMOOT-HOLMAN LIGHTING . . . . . n/c
add up Smoot-Holman's lighting dividends...
Let a Smoot-Holman lighting expert prove that good lighting costs you nothing. Call the nearest Smoot-Holman office or write direct.
SMOOT-HOLMAN INGLEWOOD, CALIFORNIA
WE SUPPORT THE NATIONAL LIGHTING BUREAU
service in the west and southwest for all school, commercial and industrial lighting

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S

THE ALL-INDUSTRY MAGAZINE OF PROGRESS, ESTABLISHED 1887,
and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity."

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—Cover Picture Pacific Power and Light Company crews at work on Swift Project. Mount St. Helens in background.

Next Month

Spring conferences of industry associations will be reported in June, the annual Convention-in-Print issue. Presidents of the three all-industry associations in the West will summarize their operations and tell plans for the future. Picture spreads will present vignettes of Western development.

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"Nothing to it! . . . Putting up the new L-M fluorescent luminaire is easy!" says Carl Hawkinson, Superintendent of Edwards Construction Company, Geneseo, Illinois. "One man can do the job. All you need is a screwdriver, a crescent wrench, and a level."

L-M's New Fluorescent Luminaires Have Slim, Modern Look . . . Easy To Install

L-M's new fluorescent luminaires are styled to give an up-to-date appearance to your streets. Their broad, cool, white light source and efficient reflector system create a cheerful atmosphere in the area, and greatly increase the scope of vision for both the motorist and the pedestrian.

Easy to Install, Easy to Maintain

L-M's new luminaires are conveniently packaged to facilitate installation. Housing is packaged separately so it can be installed first. With the housing in the inverted position, the reflector can be quickly and easily attached and wired. The unit is then rotated 180 degrees, leveled, and clamping screws are tightened.

One piece, side-hinged plastic globe and reflector assembly opens from either side. The luminaire is easily accessible for installation wiring, cleaning, or relamping. L-M's new luminaires are the only units available today that are designed to take both present and future very high output fluorescent lamps.

Get Complete Information

L-M's new street lighting luminaires are available in deep and shallow styles, in both four- and six-foot lengths. For other outdoor lighting applications, such as parking lots, store front lighting, etc., other styles are available. L-M Street Lighting Engineers will cooperate with you in designing the best system for your area.

Ask your L-M Field Engineer or Street Lighting Engineer for more complete information. Or write Line Material Industries, Milwaukee 1, Wis. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

McGRAW EDISON

LINE MATERIAL Industries *Street Lighting*

McGRAW-EDISON COMPANY

290A

Your Westinghouse representative can prove...

NEW TRANSFORMER DESIGN ELIMINATES 18 SOURCES OF CORROSION

Dome cover with new eye-bolt I-beam construction plus new internally mounted H. V. and L. V. bushings eliminate corrosive hardware. Patented "Coastal Finish"—toughest, stubbornest protection you can buy—makes these transformers corrosion-proof.

J-70794

YOU CAN BE SURE...IF IT'S

Westinghouse

Sam Waters, Westinghouse representative, demonstrates to Jack Evans, General Purchasing Agent, Ohio Edison, the volume of corrosive hardware removed from new line of Westinghouse transformers.

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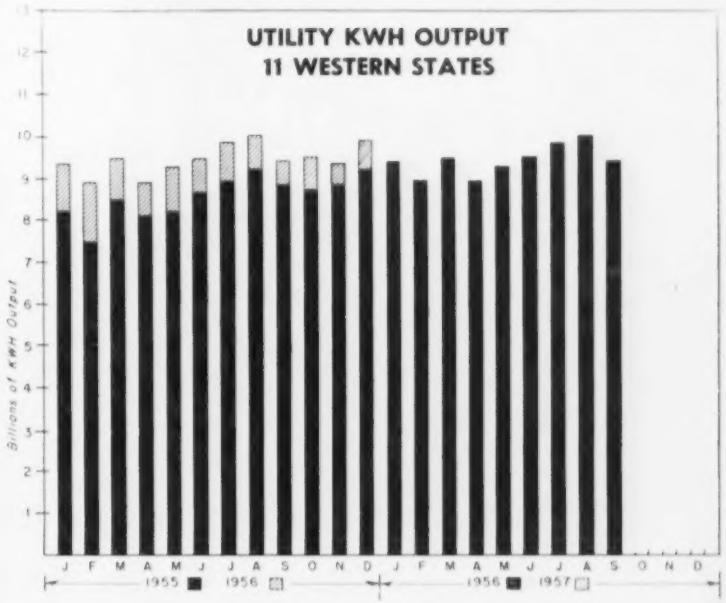
----How're We Doing?


UTILITY KWH OUTPUT
11 WESTERN STATES
Billions of KWH Output
1 2 3 4 5 6 7 8 9 10 11 12 13
J F M A M J J A S O N D J F M A M J J A S O N D
1955
1956
1956
1957

Output Comparisons

Year-to-year Kwh Output Changes in Western Regions and U. S.
Per Cent Changes Over Same Week One Year Ago

Week Ending	Rocky Mountain	Pacific Southwest	Pacific Northwest	U. S. Total
March 9	+7.0	+4.2	—4.7	+6.6
March 16	+5.9	+5.4	+0.5	+4.0
March 23	+8.0	+5.5	+4.7	+5.3
March 30	+8.1	+7.7	+3.6	+6.4

KWH Contest Popular

Electrical West's kilowatt-hour Rodeo-Contest hit the jackpot as far as interest is concerned. Entries from the first announcement are piling up, optimism over 1957 load growth is high, if the figures thus far entered are a criterion. If you haven't submitted your estimate of the kwh output in the 11 Western states yet—use the post card entry on page 133. Contest closes June 30.

Construction Briefs

Contracts for future construction in 11 Western states for January were up 13% over January a year ago. In the other 37 states the increase totaled a bare 1%. . . . Washington, Oregon and California together chalked up a 23% increase in population between July 1, 1950, and July 1, 1956. It's the highest regional percentage in the U. S. . . . Montana Power has begun building a second 161-kv transmission line from Kerr Dam 57 miles to Missoula. . . . Utah Power & Light has purchased a 100-acre site in southwest Salt Lake City for a new steam plant together with a right-of-way from that point to Midvale, where the company is building a million-dollar substation. . . . G-E has started construction of a $500,000 nuclear fuel element plant in San Jose. . . . Kaiser Steel upped its current expansion program by $81,000,000 that will expand production facilities at Fontana, Calif., and extraction facilities at Eagle Mountain, Calif., Sunnyside, Utah, and Raton, N. M.

NOW!...*Finally!*...Here's a method all wrapped up in

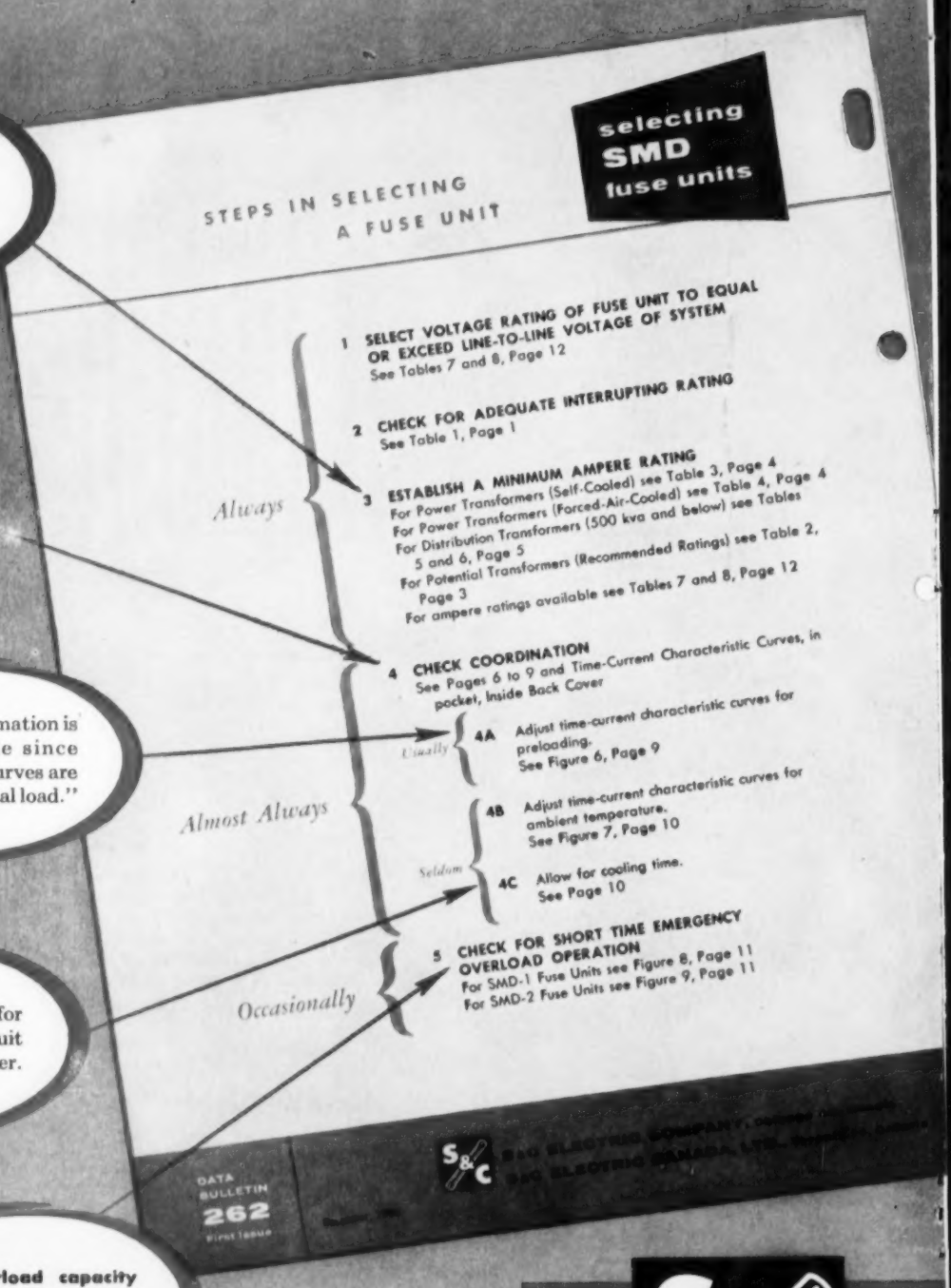
New ampere rating recommendations give maximum protection for transformers with precise allowances for short-time daily overloads.

Two methods of coordination are offered: Rule-of-thumb and Precision.

Preloading information is made available since Time-Current Curves are based on "no initial load."

How to compensate for successive short-circuit operations of the breaker.

Fuse overload capacity information is given here for the first time anywhere.


selecting SMD fuse units
STEPS IN SELECTING A FUSE UNIT
1 SELECT VOLTAGE RATING OF FUSE UNIT TO EQUAL OR EXCEED LINE-TO-LINE VOLTAGE OF SYSTEM
See Tables 7 and 8, Page 12
2 CHECK FOR ADEQUATE INTERRUPTING RATING
See Table 1, Page 1
Always
3 ESTABLISH A MINIMUM AMPERE RATING
For Power Transformers (Self-Cooled) see Table 3, Page 4
For Power Transformers (Forced-Air-Cooled) see Table 4, Page 4
For Distribution Transformers (500 kva and below) see Tables 5 and 6, Page 5
For Potential Transformers (Recommended Ratings) see Table 2, Page 3
For ampere ratings available see Tables 7 and 8, Page 12
4 CHECK COORDINATION
See Pages 6 to 9 and Time-Current Characteristic Curves, in pocket, Inside Back Cover
Almost Always
Usually
4A Adjust time-current characteristic curves for preloading.
See Figure 6, Page 9
4B Adjust time-current characteristic curves for ambient temperature.
See Figure 7, Page 10
Seldom
4C Allow for cooling time.
See Page 10
Occasionally
5 CHECK FOR SHORT TIME EMERGENCY OVERLOAD OPERATION
For SMD-1 Fuse Units see Figure 8, Page 11
For SMD-2 Fuse Units see Figure 9, Page 11
DATA BULLETIN 262 First Issue
S&C

S&C

for power fuse coordination
ONE PACKAGE!

JUST OFF THE PRESS!

It frees you from hocus-pocus; it gives you more fuse protection

The key to this method is a step-by-step sequence as shown at the left (the first inside page of the new Data Bulletin 262).

For each step, all the necessary data is at your finger tips. You have a choice of two methods—

for the man who wants more range and versatility in his fuse coordination, a "precision" technique is offered in the bulletin—

for the man-on-the-go, whose fuse coordination requirements are not so rigorous, the "rule-of-thumb" coordination is offered.

Write today for your copy of this 12-page-plus-cover Data Bulletin 262, with necessary TCC curves.

S & C Power Fuse Type SMD, illustrated below: vertical style 69 kv.

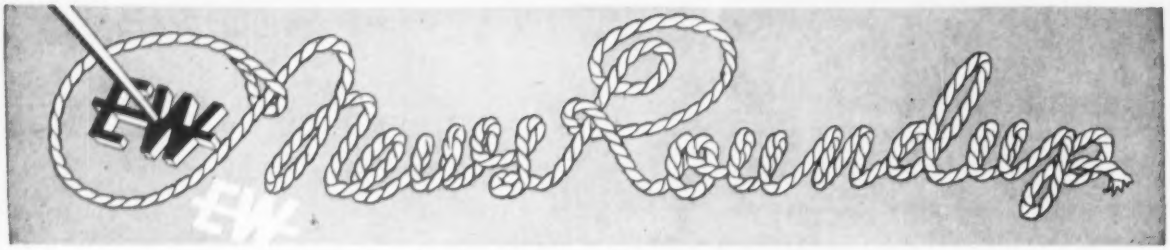
Specialists in High-Voltage Circuit Interruption Since 1910

S&C ELECTRIC COMPANY

4425 RAVENSWOOD AVENUE • CHICAGO 40, ILLINOIS • U. S. A.

In Canada: S & C Electric Canada, Ltd., 8 Vansco Road, Toronto 14, Ontario

POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR



SIGNIFICANT ITEMS FROM THE EDITOR'S NOTEBOOKS

ATOMIC INSURANCE—The Nuclear Energy Liability Insurance Assn. reports that annual premium charges have been set for six reactor projects. The rates (see table) are on a per-million-dollars-of-insurance basis unless otherwise described. The report was made to the Joint Congressional Atomic Energy Committee.

Rates vary with the type, use, size and location of the reactors and the degree of their containment. Maximum insurance available from NELIA at the present time is $50,000,000. As the table shows, the annual premium for this amount for Commonwealth Edison's plant is $250,000, the highest of the six reactors.

An important feature of the insuring program is a long-range, industry-wide review of rates as subsequent experience shows the true degree of danger around reactors. First period for review is set 10 years away. At that time a comparison will be made between the aggregate amount for losses in the premiums received and the actual losses incurred. No losses or low losses will bring about a retroactive reduction in the premiums.

FIRST REACTOR INSURANCE RATES

Premium Rate	Armour	Battelle	Commonwealth	Elk River	General Electric	Yankee
First million	$12,000	$ 6,250	$ 40,000	$ 7,360	$ 9,000	$ 20,000
Each of next $4 million	4,000	2,250	20,000	3,680	3,000	10,000
Each of next $5 million	1,600	1,050	8,000	1,470	1,200	4,000
Each of next $10 million	800	750	4,000	1,000	1,000	2,000
Each of next $20 million	500	750	2,000	1,000	1,000	1,000
Each of next $10 million	500	750	1,000	1,000	1,000	1,000
Total for $50 million	$59,000	$50,500	$250,000	$69,430	$67,000	$130,000
Per kwh cost in mills for $50 million (60% load)	(research)	(research)	0.26	0.60	(not reported)	0.18

(Commonwealth's reactor was described by NELIA as being in a "high value agricultural" area; Yankee's and Elk River's in "sparsely populated rural" areas, and Armour's in an "urban" area.)

Atomic Industrial Forum, Inc.

—EW—

A definition — A taxpayer is a person who doesn't have to pass a Civil Service test to work for the government. Our only comment is the anonymous poet must have just finished working out his 1956 income tax return.

—EW—

NO GREAT SHAKES—The much publicized San Francisco earthquake caused less than $10,000 worth of damage to the Pacific Gas and Electric system. This, according to Bob Gerdes, PG and E executive vice-president, is less than 10% of the damage experienced by some of the brisk breezes that occasionally mar the Bay area climate.

C OF C ESTIMATE—The Los Angeles Chamber of Commerce, noted for viewing events in a large perspective, predicts that 800,000 new industrial jobs will have to be made available in southern California by 1975. At that time, 15,000,000 people are expected to be living in that area, resulting from what the chamber describes as "the greatest voluntary mass migration in the history of man."

To bring it down to our perspective, it means that the southern California region is expected to have a net gain of one in the population every 90 seconds.

—EW—

GLABROUS GOLD—Attempting to design the underwater portion of the new trans-Atlantic cable, metal parts of the "repeaters" were gold-plated. Tin, the normal choice for these parts, has the property of spontaneous whisker growth. These whiskers are able to carry about 10 ma, enough to disrupt the signal.

The two cables, each about 1,950 nautical miles in length, contain 400 tubes and more than 7,000 passive elements in the 118 repeater stations. Designers hope they will be trouble-free for 20 years—because many of them are 2½ miles down.

—EW—

Rome Cable Corp. announces the purchase of plant, equipment and other assets of T. J. Cope Inc. With the purchase the company gets Cope's complete line of accessories for installation of cable. Integration plans will be announced later.

—EW—

THE ECONOMY – Businesswise, the U. S. apparently was rocking along a high plateau with minor ups and downs about balancing out. Home starts were still decidedly below the previous two years but the auto industry began to show the effects of a spring upturn. Employment in March goes to a new high for that month, 63,800,000.

Government spending is tending upward but some of the steam has been taken out of the proposed spending for new plant and equipment. Even so, the latter category still looks to be 7% ahead of capital outlays of last year.

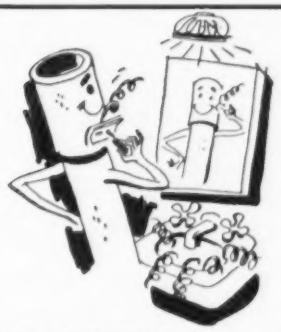
A Federal Reserve Board survey of consumer intentions for 1957 in-

Here's how Rome Cable makes easy-to-use rigid conduit in Southern California plant

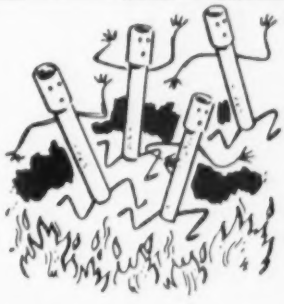
High-quality steel. Unlike ordinary "skelp," the steel that goes into Rome's rigid conduit is free of heavy mill scale and pits. Hot-rolled steel is required for Sendzimir hot-dip galvanizing, and Rome Cable further checks its steel for correct thickness, hardness, and surface condition.

Shot blasting improves surface. For improved surface quality, sheet steel is run through a shot blast. This completely removes all oxides, rust, roughness, or dirt, leaving a uniformly clean surface. Stock is then slit to proper widths and cold rolled into round pipe.

Electric resistance welded for strength. After pipe is cold formed—*cold*-forming maintains uniform thickness—electric resistance welding closes the seam. This process, unique with Rome Cable in the conduit field, produces an uncontaminated weld that's stronger than the pipe itself.

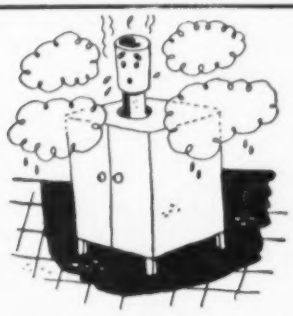


Scarfed inside and out. Next, a scarfing tool removes any and all weld flash from the pipe. Each length is inspected for straightness; and, if necessary, it's straightened on a special machine. After chamfering and straightening, the pipe is ready for annealing and galvanizing.

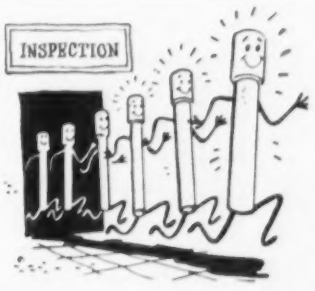


Sendzimir process begins. First step is flame preheating to burn off dirt, oil, and scale—inside and out. A reducing furnace then anneals pipe, providing a uniformly soft and ductile conduit that's easy to bend. This furnace also cleans pipe, produces a mirror-smooth stain-free surface.

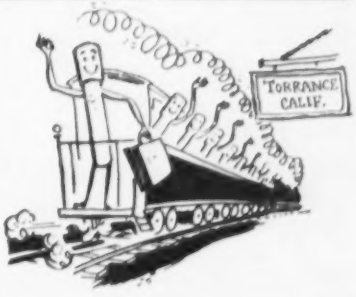
The zinc bath. The pipe goes into the molten zinc at a temperature close to that of the zinc. No pickling or fluxing is required. Each length is exposed to the zinc at a uniform temperature for the same time, assuring a uniformity never before attained in galvanizing rigid conduit.



Sendzimir process ends. After emergence from the hot-dip zinc bath, excess molten zinc is removed from both inside and outside surfaces by an air- and superheated steam wipe.



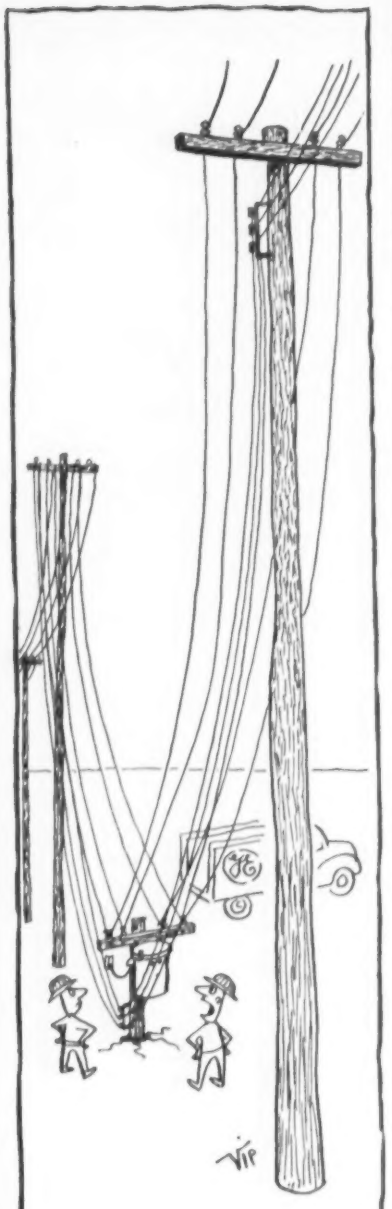
Final Inspection. The conduit is now carefully inspected—inside and out. *Every single length is individually checked.* This thoroughness assures the closest possible control over quality.



From Rome Cable to you. Color-coded *metal* thread protectors and Underwriters' label are applied, and the pipe is bundled for shipment. Rome rigid conduit is now ready for your use.

If you would like to examine a *free sample* of this premium-grade product, contact your nearest Rome Cable representative—or write to Dept. 944B, Rome Cable Corporation, Rome, New York.

ROME CABLE
CORPORATION



"I guess you'll have to uprate it; it must have been carrying more than its load!"

Do you have overloaded distribution transformers? Call a General Electric Apparatus Service Shop. The shop can uprate your old transformers in both kva and voltage for about two-thirds the cost of new transformers . . . can also convert to self-protected type. And you get new-transformer warranties. Call your G-E Apparatus Service Shop or Sales Office.

431-57

Progress Is Our Most Important Product

GENERAL ELECTRIC

dicates that there is stiffening buying resistance to major appliances but a strictly bullish area in the home improvement market. More people are planning home modernization projects than ever before and the median expenditure is expected to jump from $370 last year to $460 in 1957. Can it be that the Housepower program is finally widening the bottleneck for Better Living . . . *Electrically?*

—EW—

SQUIRREL CAGE – That U. S. business in general is in an Alice-in-Wonderland economy is revealed by FPC statistics for January. It seems that everyone has to run faster today just to stand still. For example, while the January electric revenues were up 6.2% from the same month last year, net income after increased expenses for fuel, taxes, etc., was 2.4% less. Significantly, every item on the statement showed an increase except the income that was left to pay a return on the investment.

Another example of the situation is given in the annual report of the San Diego Gas & Electric Co. In a tabulation of operating statistics, the plant investment per customer has risen from $451 in 1952 to $607 in 1956. The plant investment per thousand kilowatts sold has jumped from $76 to $91. Because of substantial growth, both in customers and energy sales, the plant investment per revenue dollar has remained essentially the same, at approximately $4.50. And despite substantial increases in both debt and equity financing necessary to pay for new facilities, common earnings per share were maintained at the same dollar level as in 1952.

—EW—

Pacific Gas and Electric Co. has reported that the cost of advertising and a brochure about the Trinity River project is going to be charged off earnings of stockholders and will not be considered an operating expense. The ad outlined the PG and E partnership proposal and explained its merits.

—EW—

EARLIER – The 1957 edition of "I Want to Know About the Electric Industry" is available now from Edison Electric Institute. Spring publication of the very useful booklet will keep the figures used more current than publication in the fall.

PAY SCALE—A survey of 400 engineers in Kansas City disclosed the average earning in 1955 was $9,140 whereas the engineers' average of the amount they thought they should earn was $10,625.

Earnings of the group varied from $4,000 (2%) to $50,000 (1%).

The largest percentage reported $7,500 (21%), followed by $10,000 (19%), and $6,000 (14%).

Other findings indicated that the engineers surveyed were 89% satisfied with engineering as a profession *but* 52% felt they were engaged in daily tasks that could be effectively handled by subordinate personnel.

Fifty-four per cent of the engineers reported that they were paid for overtime, but the basis was not detailed.

—EW—

AIEE announces the revision of *Electric Power Distribution of Industrial Plants*, the familiar "Red Book." In addition a companion book, *Grounding of Industrial Power Systems*, has just been released. Prices $3.50 and $1.20 with 50% discount to members.

—EW—

HAVE YOU READ "Monopoly Power As Exercised by Labor Unions," which is now available from the National Association of Manufacturers?

It is a thoughtful piece done by a committee of labor-management experts. Copies are available by writing NAM at 2 E. 48th St., New York 17, N. Y.

—EW—

WHAT KIND OF BABY? – Annual reports of 1956 business activities are making their appearance on the scene. Public Service Co. of Colorado has taken what seems to be a wise step in getting employees to have a realistic answer ready for questions about profits.

Profits are reported in millions of dollars but John Doe doesn't relate them to investment. He doesn't get the picture on *percentage*. A piece sent to Public Service employees compares it to babies. It goes something like this:

One person tells another he has just seen a newborn baby weighing 200 lb. The second person doubts the statement. The first shows him a baby elephant. The employee information piece advises employees to let people know what kind of baby the annual report is talking about.

The company has net earnings of $10,200,000 to compare with an investment of $223,000,000. Boiled down to terms most people understand, the company is earning approximately $460 from each $10,000 invested.

—EW—

PROGRESS REPORT—A fair indication of the virility of the electrical industry may be found in a quotation by Frank McLaughlin, president of Puget Sound Power & Light Co., who reported at his annual meeting of shareholders as follows:

"The company has had a dramatic resurgence since 1952. There has been a sharp reversal from the 'dead end' outlook of those days. In this short span of time, Puget's performance, position and prospects have improved greatly. Revenues have increased almost 40%. Despite a huge loss of business (during 1948-51 Puget was forced to sell to public agencies electric properties which provided about 60% of the company's revenues), revenues for 1956 were only 12% less than in 1948—notwithstanding soaring wage and materials costs and skyrocketing federal income taxes."

Puget's production budget for 1956-59 is $90,000,000 for new facilities.

—EW—

The Kansas City Athletics and Admiral Corp. have found a way to separate the men from the boys among baseball pitchers. They are using traffic radar to check the speeds of pitched baseballs. Speeds of 70 mph have been recorded, but it is expected they will find even faster pitches.

—EW—

RUSSIAN EDUCATION – Our English contemporary, the *Electrical Review*, recently carried an interesting report of a British team of educators who visited the Soviet Union. Behind the iron curtain, 92,000 engineering students enter full-time courses in engineering annually with part-time courses being given to 165,000 annually. The full-time courses last from 5 to 5½ years (4,500 to 5,000 hours of study). The six-day educational week is universal.

There are three to six applicants for each place and Russia has wisely made engineering one of the most attractive careers, both in rewards and esteem.

The educators also reported that

Your Electro-Tech "Rep"...

stocks a complete line of impregnated and coated insulations

You get all the advantages of one-source buying when you deal with your nearby Electro-Tech distributor.

He stocks Electro-Tech's complete line of coated and impregnated paper, cloth, glass cloth and asbestos cloth insulations in rolls, sheet and tape. Thus, you can pick the insulations that give you the exact dielectric and mechanical strengths, temperature and moisture resistances, lightweights and flexibility you need.

His stocks enable him to offer you immediate delivery and special scheduling . . . enable you to reduce your inventory.

Then, too, your Electro-Tech representative is an expert on recent insulation developments and applications. He's backed by the Electro-Tech staff, laboratories and facilities —where custom-built insulation frequently can be manufactured at mass-production prices. For the name and address of your nearest Electro-Tech distributor, write:

Electro-Technical Products
DIVISION OF
Sun Chemical Corporation
Dept. E-24-581, 113 East Centre Street, Nutley 10, N. J.

DIVISIONS OF SUN CHEMICAL CORPORATION

HORN (paints, maintenance and construction materials, industrial coatings) • WARWICK (textile and industrial chemicals) • WARWICK WAX (refiners of specialty waxes) • RUTHERFORD (lithographic equipment) • SUN SUPPLY (lithographic supplies) • GENERAL PRINTING INK (Sigmund Ullman • Fuchs & Lang • Eagle • American • Kelly • Chemical Color & Supply Inks) • MORRILL (news inks) • ELECTRO-TECHNICAL PRODUCTS (coatings and plastics) • PIGMENTS DIVISION (pigments for paints, plastics, printing inks of all kinds) • OVERSEAS DIVISION (export) • A. C. HORN COMPANY, LIMITED (Canada) • GENERAL PRINTING INK CORPORATION OF CANADA, LIMITED • FUCHS & LANG de MEXICO, S. A. de C. V.

NEW
FAST-APPROACH
HYDRAULIC PUMP
For conduit benders
two-speed action
saves time, money

GREENLEE No. 798-AC

The new GREENLEE No. 798-AC Hydraulic Power Pump operates GREENLEE Conduit and Pipe Benders *three to five times faster* than a hand pump. (Teams with other conduit benders, too.) Exclusive GREENLEE fast approach, with automatic change-over to lower speed high-pressure drive, eliminates costly waiting time, makes jobs go faster and easier. Electric motor-driven pump develops 6,000 psi continuous pressure, up to 10,000 psi intermittent. Also speeds work with knockout punch drivers and other hydraulic tools.

GREENLEE *Send coupon*

GREENLEE TOOL CO.
1765 Columbia Ave.
Rockford, Illinois

Please send illustrated Bulletin E-223 on Greenlee No. 798-AC Portable Hydraulic Power Pumps.

NAME _____

COMPANY _____

ADDRESS _____

CITY AND STATE _____

the public mind in Russia generally recognizes, to a much higher degree than elsewhere, that engineering is of primary importance to the national economy and the national security.

—EW—

HIGH BILL—Kathryn Kirkreit, a customer service interviewer for Tacoma City Light, was talking with a woman who complained that her electric bill was too high.

Kathryn suggested that perhaps the lady had been heating her kitchen with her electric oven, or using small space heaters in some of the rooms.

"No, I'm not doing that," the customer replied, "but I do use my electric toaster to heat the bathroom."

—EW—

From the "Newsletter" of Seattle City Light comes this bit of wisdom: "To avoid that run-down feeling, cross streets carefully."

—EW—

HIGHWAY LIGHTING — The American Roadbuilders Assn. is urging states to include more illumination as part of the big federal program for interstate roads. Even though current construction costs are running far ahead of the 1954 estimate, statistics are mounting to prove that highway traffic safety lighting is economical.

Maintenance of a 1 f-c level on the roadway probably would cost from 2 to 5% of the total outlay for a highway. For an 8-lane freeway, the cost might amount to $200,000 per mile.

At present only 16 states have laws that specifically include lighting expenditures in highway authorizations. What is needed is more state enabling legislation to permit the industry to capitalize on a really important lighting market.

—EW—

WHAAAT?—A release from Washington Water Power Co. caused an editorial doubletake recently. It mentioned, among other things, that a mountain on snowshoes would be used to measure the water content of snowpack of the Coeur d'Alene watershed.

It turns out that the athletic "mountain" is Wilfred "Rocky" Mountain, a member of the water supply department.

Pacific Gas and Electric Co. has again received the Laura McCall Award for advancement of electrical living, and Marguerite Fenner, head of the home economics department, became the first utility home economist to win it five times. Presentation of the award took place at the EEI Annual Sales Conference in Chicago. For Marguerite Fenner's award-winning idea, see the Market Development section.

—EW—

NO END—In a talk before the Los Angeles Section of the American Institute of Electrical Engineers, Dr. Guy Suits of General Electric told of recent scientific developments that make Buck Rogers passe, to say the least.

"Superpressure" research has already produced man-made diamonds and "borazon"—an entirely new mineral. Science can now create and hold pressures of 2,500,000 psi and temperatures of 5,000 F, and this is opening up a whole new area of research.

He said these new techniques will be used to learn new things about electrical conductivity, magnetism and a host of other areas where "finding fundamental facts may produce unheard-of wonders that will enrich our lives in the future."

Dr. Suits and others like him invite the imagination to explore the future, but the mind has to ask: "Where does it end?"

—EW—

Once again Arizona Public Service Co. has used the "Sunday supplement" format for its annual report to stockholders. Full color rotogravure brightens the cover page and illustrations carry the reader through the report. A 1958 construction budget of $48,000,000 impresses.

—EW—

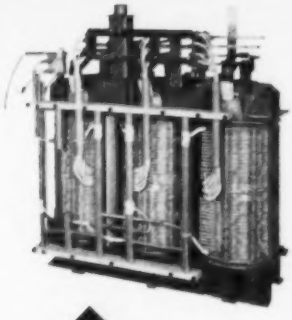
Of all the fishes in the sea;
Of all that ever swam;
None again will ever be
The first around The Dalles Dam.

While thousands of visitors watched the first barge tows through The Dalles Dam navigation lock, a lonely Steelhead salmon made his way through the fish-passing facilities at exactly 10:05 a.m., March 17. He was the first of 35 Steelheads and two Chinooks.

From coast to coast...

Allis-Chalmers Network Transformers

Are meeting growing system needs with long-term, reliable operation. Compact design, rugged construction, and easy maintenance features make A-C transformers your best buy for network expansion. Call your nearby A-C office for information, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.



COMPACT, LOW-LOSS DESIGN

Thermal capacities are high for severe load conditions. Sturdy, time-proved core and coil construction meets repeated short-circuit stresses of network operation.

PAN-TYPE RADIATORS

This optional design offers advantages in ease of cleaning, painting and handling, with cooling efficiency equal to conventional radiators.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

LIVE BETTER ELECTRICALLY

A-5059

NOW...SANGAMO SECONDARY CAPACITORS!

to release transformer capacity, reduce losses, and improve voltage levels on secondary circuits

Small in size
Light in weight
Easy to handle
Easy to mount

Sangamo secondary voltage rated capacitors are built with the same processing care and to the same high standards that have put Sangamo Diaclor Primary Capacitors on the "approved list" of most major utilities in two short years. They are built to distribution engineer's specifications—with *all the features you want* to meet your service requirements.

CORROSION-RESISTANCE THAT'S MORE THAN SKIN DEEP—Cylindrical cases are of all welded steel construction, with mounting supports brazed to the case. There are no pockets to accumulate dirt or moisture. Tin plating, aluminum metallizing and two coats of baked vinyl resin base paint provide corrosion resistance even when case is scratched.

CYLINDRICAL DESIGN WITH HIGH PURITY KRAFT PAPER AND ALUMINUM FOIL—Provides an efficient unit with minimum weight and size. Elimination of foil tabs prevents possible injury to paper.

SPECIAL DIACLOR IMPREGNATION FOR STABILITY OVER A WIDE TEMPERATURE RANGE—These capacitors operate at temperatures from -40°C to +46°C.

INTERNAL DISCHARGE RESISTOR TO PROTECT LINEMEN—Reduces residual voltage to 50 volts or less in one minute.

PERMANENT HERMETIC SEAL WITH SOLDER SEALED BUSHINGS—Wet process porcelain bushings, metal bonded to the case, provide gasketless seal. Clamp type terminals are of tinned copper alloy, can be used with any type of conductor.

UPRIGHT OR INVERTED SWIVEL MOUNTING—Enables best utilization of available pole space.

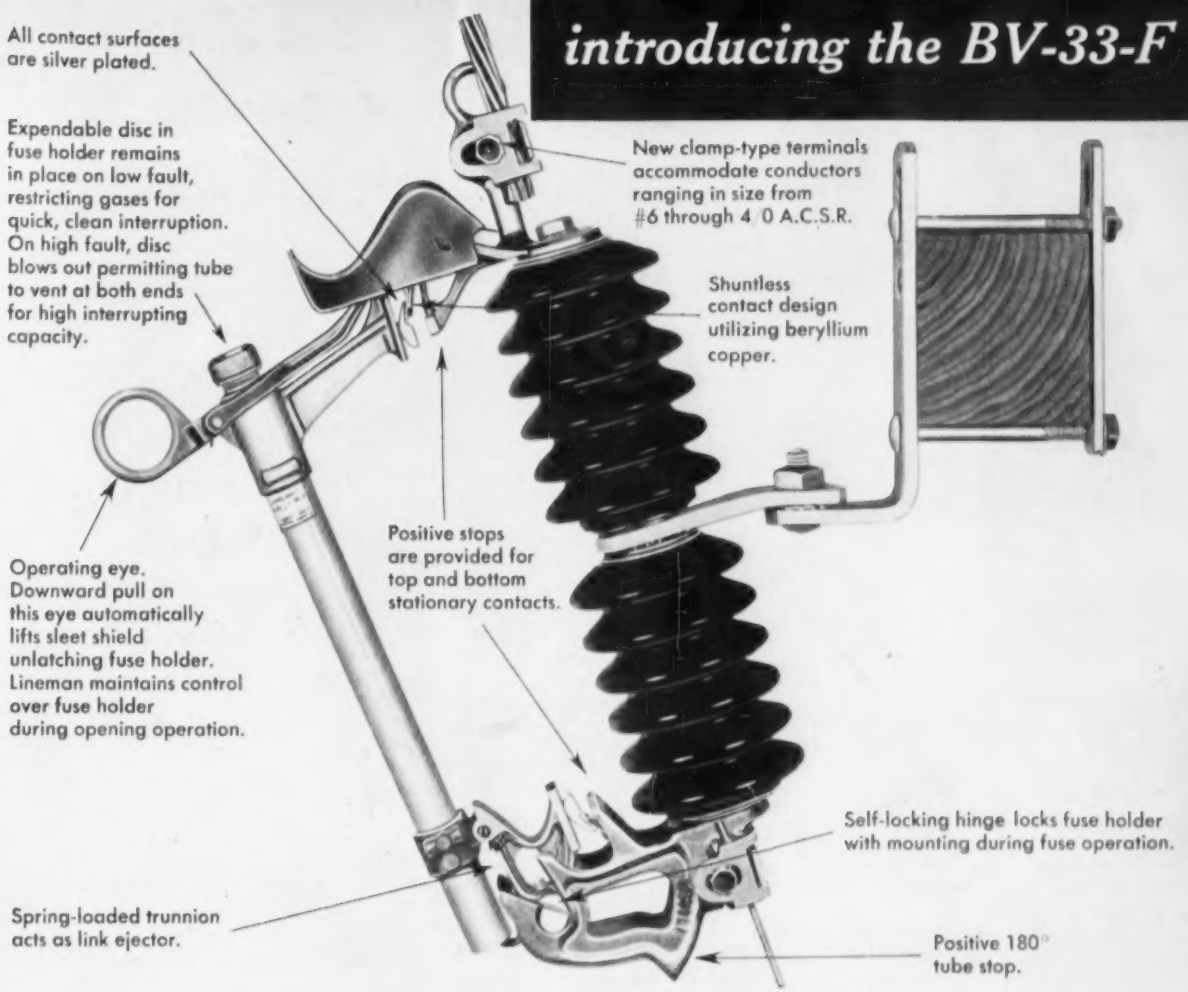
Order from your Sangamo Representative, or write us for complete information and prices.

Size	Diameter	Overall Height	Net Weight
3 KVAR	5-7/16"	15-3/8"	18 lbs.
5 KVAR	5-7/16"	21-3/8"	28 lbs.

FC57-2A

SANGAMO ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

introducing the BV-33-F


All contact surfaces are silver plated.
Expendable disc in fuse holder remains in place on low fault, restricting gases for quick, clean interruption. On high fault, disc blows out permitting tube to vent at both ends for high interrupting capacity.
New clamp-type terminals accommodate conductors ranging in size from #6 through 4/0 A.C.S.R.
Shuntless contact design utilizing beryllium copper.
Positive stops are provided for top and bottom stationary contacts.
Operating eye. Downward pull on this eye automatically lifts sleet shield unlatching fuse holder. Lineman maintains control over fuse holder during opening operation.
Self-locking hinge locks fuse holder with mounting during fuse operation.
Spring-loaded trunnion acts as link ejector.
Positive 180° tube stop.

A Powerful New Southern States Cutout For Handling Restricted or Heavy Faults

CHECK THE FEATURES of the powerful new BV-33-F! Whether you are a lineman, or an engineer responsible for applying cutouts on an entire system, we believe the BV-33-F will meet your requirements.

Despite its exceptionally high interrupting rating the BV-33-F clears restricted faults quickly and cleanly. Secret of its success on faults of any magnitude lies in the expendable disc in the fuse holder cap. On low faults the disc remains in place, restricting gases within the tube for maximum arc-quenching ability. On high faults the disc blows out and the cutout double-vents for maximum interrupting capacity.

The BV-33-F can be easily converted to a single-vented SV-33-F by replacing the pressure relieving cap with a solid cap.

For additional information on these new cutouts contact your local Southern States representative.

CHECK THESE INTERRUPTING RATINGS

KV	Continuous Current Amps	Interrupting Capacity RMS Amps
TYPE BV-33-F		
5	100	8,000
7.5	100	8,000
15	100	6,000
25	100	4,000
TYPE BV-33-FH		
5	100	10,000
5	200	10,000
7.5	100	10,000
7.5	200	10,000
15	100	8,000
15	200	8,000
25	100	5,000

IN CANADA: Dominion Cutout Co., Ltd., Toronto

SOUTHERN STATES
EQUIPMENT CORP.
HAMPTON, GEORGIA

IF W. B. "Bill" Elmer, manager of Wheeler Reflector's street lighting department, never again attempts to hold a meeting in San Francisco, there are about a dozen men who know why.

Bill's meeting started with the discovery that a rented movie projector was out of order. He proceeded to conduct another portion of his presentation against competition from the repairman and odd noises from the faulty machine. Then came the planned coffee break.

The meeting proceeded with the projector operating properly—for a while—until the film started jumping cogs and then the projector lamp burned out with a peculiar bubble on it that prevented replacement.

Did the trouble end there? Not at all. An earthquake shook the city with enough violence to test the courage of the most hardy citizens and succeeded in breaking up the meeting.

In the midst of these adversities, however, Bill told an interesting story about the company's new low linear brightness (LLB) street lighting luminaire, which is bound to create quite a stir in the lighting field.

Boston probably looked pretty good to the traveling executive after his experience here.

Northern California Region

► Bob Ingalls, a "Son" in C. E. Ingalls & Sons, representative for Delta-Star Division of H. K. Porter Co., reports that John H. Lawton has joined the firm as a sales engineer.

► Ronnie Burris, Lee Butler and Bob Jinks have teamed up to open a new wholesaling firm at Hanford, Calif. The name of their new company is Kings Electric Supply Co.

► Delta Electric Supply Co. is the name of a new wholesaling firm recently opened by Bert Reisfelt at 535 N. Visalia, Stockton.

► Harry Pierce, a veteran in the electrical industry of this area, has joined Incandescent Supply Co. at San Jose. Former service included employment with Diehl Electric Supply Co. and Graybar Electric Co.

► Al Phillips has opened a new branch of Phillips & Edwards Electric Corp. at 501 Howland Ave., Redwood City, Calif. Harold McDonald is manager.

► Everything is new at Osborne & Dermody Supply Co. in Reno. The new name of the firm, following a new ownership arrangement, is Western Electrical Distributing Co. It is now in a new office and warehouse at 550 Evans Ave. Francis Wells is manager.

► Sylvania Electric Products, introducing its new wall-to-wall lighting system, staged colorful and interesting demonstrations in Los Angeles and San Francisco. Traveling with the exhibit was R. G. Sauer, Wheeling, W. Va., who is national sales manager of fixtures.

► Paul Gallagher, who is replacing Bill Pierce as district manager for the Edwards Co., moves to the Bay area from Philadelphia where he has been with the company for a number of years. Not the least of his problems in making the move is finding housing adequate for his wife and four children.

Friends of Bill Pierce will like to know that his new address is 246 Simpson St. NW, Atlanta, Ga. He is Atlanta district manager.

► Bob Barbaras, manager, distribution equipment sales for R&IE Equipment Division of I-T-E Circuit Breaker Co., was a West Coast visitor in April. He visited Seattle, Portland, San Francisco and Salt Lake on his whirlwind tour before returning to Greensburg, Pa.

POLITICAL HI-JINKS—William H. "Doc" Hill, president and principal stockholder of Hilo Electric Light Co., Hilo, T.H., is just winding up a session in the Territorial Senate where he is the second senior member. One of his enthusiastic political supporters is his pet mynah bird, which has been taught to say "Vote for Doc." "Doc" Hill was first elected a territory senator in 1933

Intermountain Region

"WE'VE" expanded and expect to do some more," is becoming a common remark in the growing electrical business in the Intermountain region. For instance, John Tracy, partner in Tracy-Behrent Engineering Co. in Denver, reported his electrical consulting firm—founded only four years ago—had moved into its own building at 2535 W. Sixth Ave.

"Our business has at least quadrupled since we started," Tracy said. "We've just added five electrical and two mechanical engineers and the way business is growing we'll have to add more." Tracy's partner is Robert Behrent. Besides themselves, they have seven electrical and two mechanical engineers as well as draftsmen busy on industrial and commercial contracts. Their one-story building has 1,750 sq ft.

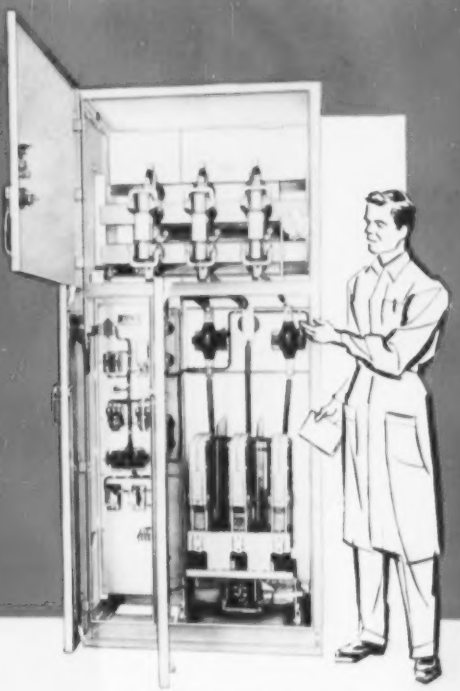
The same story comes from I. J. "Joe" Vivian, vice-president and general manager of Everett T. Vonier Inc., representative for Rome Cable Corp. in the region.

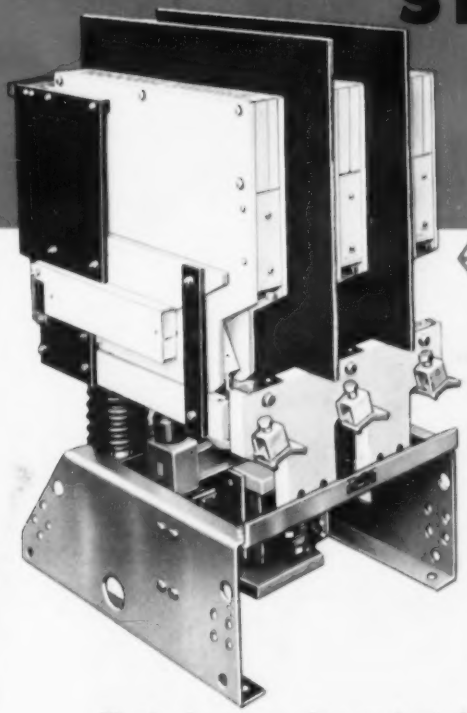
At the start of this year, for the first time Rome Cable's rigid conduit was marketed in Texas, New Mexico, Colorado, Wyoming and the panhandle of Nebraska. The conduit is produced at Rome Cable's plant in Torrence, Calif.

"We're very encouraged by sales to date and future potential looks even better," Vivian said. The con-

something NEW...

in HIGH VOLTAGE CONTACTORS and STARTERS





The new Allen-Bradley solenoid operated—*one* moving part—high voltage air break contactor.

Maximum Ratings:
1500 hp, 2300 volts
2500 hp, 4600 volts

The same design features which have made Allen-Bradley low voltage controls so universally popular have been incorporated in the new, air break, high voltage line. These simple solenoid starters have only *one* moving part. That's why a tremendous mechanical life is assured. Using double break, silver alloy contacts, these are always in perfect operating condition. New blowout design and novel arc chutes assure rapid arc extinction—regular contact inspection is made unnecessary.

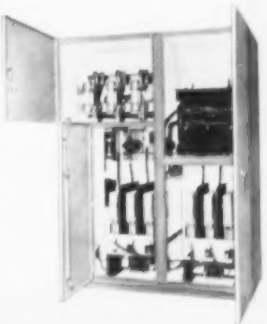
Available in a complete line of full voltage and reduced voltage starters—nonreversing or reversing—for squirrel cage, part winding, slip ring, and synchronous motors. Maximum ratings: 1500 hp, 2300 volts; 2500 hp, 4600 volts.

The entire design justifies the designation—"heavy-duty" starters. Why not ask us to send you complete information?

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

Bulletin 1159 across-the-line starter for high voltage squirrel cage motors.

Bulletin 966 high voltage air break across-the-line type synchronous starter.



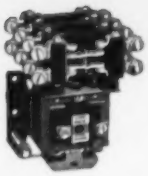
Bulletin 1172 reactor type, high voltage squirrel cage reduced voltage starter.

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

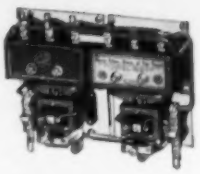
6-57-M

"we'll use ALLEN-BRADLEY Quality Motor Control ...it's trouble free!"

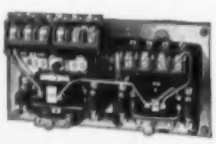
SPECIFY THESE RELIABLE MOTOR CONTROL UNITS



Bulletin 700
Universal Relay with
N.O.—N.C. Contacts



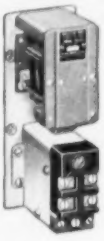
Bulletin 705 Size 2
Reversing Starter



Bulletin 715 Two
Speed Consequent
Pole Starter

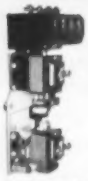
Bulletin 802T Adjustable
Lever Oiltight Limit
Switch

Bulletin 702 Three Pole
Size 2 Contactor



Bulletin 849 "On-Delay"
Pneumatic Timer

Bulletin 892
Handy Terminal
Blocks

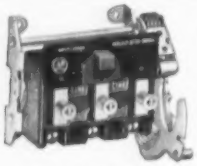


Bulletin 704, Mechanically
Held, Hum-free Relay

Bulletin 200
D-C Relay

Bulletin 350
Reversing Drum Switch

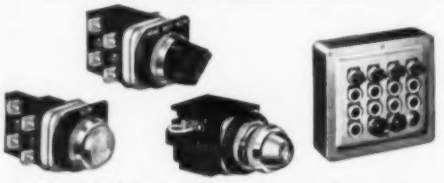
Bulletin 836
Pressure Control in
NEMA Type 4 Enclosure



Bulletin 894
Visible Blade
Disconnect Switch

Bulletin 709
Size 4 Automatic
Starter

Bulletin 609
Three Phase
Manual Starter



Oiltight Push Button, Selector Switch, Press-to-Test
Pilot Light, and completely assembled Oiltight Station

Allen-Bradley *quality* components assure you millions of trouble free operations. The simple design, maintenance free, double break, silver alloy contacts, and rugged design features have made them the first choice among design engineers, contractors, and maintenance men. You just can't go wrong with this QUALITY line.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

Send for your copy of the new 7th edition of the Allen-Bradley Handy Catalog

6-57 M

duit is being marketed by five distributors in Denver and others in Casper, Wyo., Santa Fe and Albuquerque, N. M., Scottsbluff, Nebr., Pueblo and Grand Junction, Colo. "There are just three of us now," says J. C. O'Donnell, "but we figure we will be opening branches in the rest of the region before too long." O'Donnell heads a new firm, the J. C. O'Donnell Co., which represents in the Intermountain region a half-dozen electrical manufacturers.

O'Donnell was formerly with Westinghouse Supply in San Francisco. Joining him in the new enterprise are Edward K. Curry, former district manager in the region for Hoffman Radio & TV, and Thorle Vieau, former district manager for Crouse-Hinds Co. in Denver.

Succeeding Vieau as district manager for Crouse-Hinds will be F. J. Reinhardt, electrical engineer, who has been with Nunn Electric Supply Co., Amarillo, Tex., for the past 10 years. Pending Reinhardt's arrival in Denver, W. J. Klaus, district manager at Tulsa, Okla., pinch-hit in charge of the Denver region.

► J. L. Singleton of Milwaukee, vice-president, industries group of Allis-Chalmers Mfg. Co., conducted a general sales meeting at Denver for district managers and sales representatives from branches at Phoenix, Albuquerque, Butte, Salt Lake City, El Paso and Spokane. M. G. Smith, 1955 graduate in electrical engineering from the University of Idaho, has been added to Allis-Chalmers' Denver staff as sales representative in the utility field.

► Glen B. Gaer of Gaer Sales Co. was elected president of the Rocky Mountain Electric Manufacturing Representatives Club. He succeeds Clyde P. Elliott. Other new officers are Terrence Tilley, vice-president, Kenneth B. Schumann, secretary, and George Kaub, treasurer.

► R. L. "Dick" Brown of Boyd Distributing Co. reports his firm has been appointed Rocky Mountain distributor for hi-fi radio and phonographic equipment manufactured in West Germany. The products are Tonfunk high fidelity system and Fonovox combination radio and record changer.

Pacific Northwest Region

THE Pacific Northwest must be growing up. People are beginning to celebrate the 100th anniversary of this and that. The province of British Columbia will be 100 years old next year; will put on a Centennial celebration and has selected Harold Merilees, manager of public information for B. C. Electric Co., to be general chairman of the committee.

B. C. Electric broke the $100,000,000 mark for a one-year construction budget in 1957, Dal Grauer, president, announced. Generation will take $35,800,000; other electric, $27,800,000; transportation, head office and gas, $38,300,000; for a total of $101,900,000. The company is the only "Roman Rider" left in the Northwest.

Meier & Frank Co., Portland's most famous department store, reached its 100th birthday April 1. Stimulated by a "stupendous" advertising build-up, abetted by such "spectaculars" as fireworks on the Willamette River, 10,000 people crossed its portals in the first five minutes after the opening Monday morning. The major appliance department, occupying about one-fourth of the eighth floor, sold umpty-umpth thousands of dollars worth of appliances the first day. The store does not release this type of information but educated estimates are slightly on the "colossal" side.

On March 15, the Washington Water Power Co. was 68 years old, having been incorporated in 1889. The birthday was celebrated by the annual meeting of the "Trailblazers," the company's old-timer organization of 20-year men. Attendance was 463. Total membership is nearly 25% of the company employees.

► WWP announces promotions and re-assignment of duties of executive officers: George M. Brunzell, assistant to the president, has been named vice-president, and W. L. Thrailkill, vice-president in charge of operations, has been named vice-president in charge of finance. Three long-time executives with the company have been made assistant vice-presidents: Arthur H. Wegner, rates and contracts; J. Harry Lucas, personnel and industrial relations; John A. Riner, purchasing, stores and general services.

► *News from NELPA*—Northwest Electric Light & Power Assn. is 49 years old this fall. New executive manager, Alden F. Krieg, who replaced Berkeley Snow (retired) last fall, has completed a round of travel that took him to every major city and every utility member's territory. He reports plans well along for the three section meetings this spring (see April ELECTRICAL WEST, p 176).

New class B members (manufacturers, distributors, manufacturers' agents, service companies, etc.) joining in recent weeks have included:

Virgil A. Warren Advertising Agency, Spokane, now handling WWP account, Virgil A. Warren, owner and operator;

Truck Welding & Equipment Co., Seattle, M. E. Earnheart, manager, makes hoists, bodies and truck tanks;

Haskins & Sells, Portland, E. H. Phillips, principal, audits several of the member utilities;

Robblee Utilities Equipment Co., Seattle, E. S. Ripley, manager, construction and maintenance equipment to power companies;

William A. Horning Co., Vancouver, Wash., manufacturers' agent handling Jasper Blackburn Corp. and other lines.

► Some comings and goings among other manufacturers and their agents finds Andy Genor, recently consulting engineer in Denver, coming to Line Material Industries, Spokane, as mountain states division street lighting engineer; Cliff Malm, recent graduate of University of Washington, to be field engineer for Line Material in Anchorage, Alaska; Kevin Kearney from the Eugene Water & Electric Board, going to Springfield, Ill.; and Stan D. Reed, recently of the engineering department of Portland General Electric Co., to Line Material in the Chicago area.

► In a reshuffle of the lines formerly handled by C. E. "Chuck" Klaus, who was killed in an auto accident near Medford last summer, J. A. Tudor & Associates of Seattle took the Allen-Bradley and other lines, and also took William G. Meyers from PGE's engineering department to manage Tudor's Portland office. Andrew L. Polich Inc. of Portland took over the S & C line.

► RT&E Corp., Waukesha, Wis., has called back to the home office L. D. Barre of Portland, formerly sales representative in the Northwest. Barre is to be assistant to the vice-president. To replace Barre in the Northwest, the company has taken Howard Dunn, formerly with Allis-Chalmers, Seattle. U. E. Sandelin, manager of Allis' Portland office has put on a new sales repre-

KLEIN
preferred by linemen
. . . electricians

When it comes to leather goods for linemen or electricians, the name Klein today stands for the highest in quality as it has since the first wires were strung.

In Klein-Kord, too, Klein offers to industry the first specially woven fabric for safety straps—a fabric designed to permit the use of a tongue-type buckle without the risk of slitting or ripping under severe strain.

Now in Nylon Klein-Kord safety straps Klein still leads with the newest in safety equipment specially designed for use by utilities wherever power or communication lines are strung.

Write for Free Tool Guide
A free copy of the new Klein Pocket Tool Guide will be sent to anyone interested on request.

Ask your supplier

Foreign distributor:
International Standard Electric Corp., N.Y.

Mathias KLEIN & Sons
Established 1857 Chicago, Ill., U.S.A.
7200 McCORMICK ROAD • CHICAGO 45, ILLINOIS

sentative, Merl Smith, who has just completed the student training program of the company in Milwaukee, Wis.

► Fons Hughes, safety director of Pacific Power & Light, accepted for the company an award of merit from EEI and NSC for more than 1,000,000 man-hours worked without a time-loss injury. Final score was 1,235,000 man-hours from Oct. 12, 1956, to Jan. 3, 1957. . . . At Portland General Electric, the Tualatin Valley division worked 541 working days without a lost time accident. Ed Meihoff is general line foreman. Roland Blantz, safety director, is offering company men $2 toward the purchase of safety shoes if they'll wear them on the job. . . . V. V. McDonnell, safety director for Montana Power, has been putting on a demonstration of electrical safety before schools, service clubs and other organizations. He has been on every TV station in the state in the past year. . . . The year 1956 was accident free in the Palouse division of WWP, according to George Brunzell, vice-president. Victor S. Casebolt is division manager. . . . And here's a salute to a brother columnist. Eldon E. Beck, former safety director for Idaho Power, now retired, is writing a column about the company old-timers and retired people in the company's *Current News*, and a very interesting one, too, principally to company folks and those of the rest of us who knew many of his subjects.

Pacific Southwest Region

MEMBERS of the southern California area group, National Association of Electrical Dealers, met March 29 at the Disneyland Hotel.

Speakers included Bill Cook of Cook-Nichols Co. and Dick Cooley of California Wholesale Electric Co.

Out of the meeting came plans to start a school for distributors' employees at Los Angeles Trade-Technical Junior College, formerly the Frank Wiggins Trade School. The school would feature teachers from within the wholesaling industry. No date of opening has been set.

► Allied Industries of Los Angeles was among exhibitors taking part in the Western Air Conditioning, Heating, Ventilating and Refrigeration Show, May 4-8 in Los Angeles Exhibition Hall. Items included Tork time controls and the Pyramid Instrument line.

June 20-30, Allied will exhibit its Remcon line at the Los Angeles Home Show. Displays will be set up in the Live Better . . . *Electrically* section and also in the exhibit section of the Los Angeles Department of Water & Power. Displays at both shows will be under the supervision of Don Shively of Allied.

The firm showed items in the Remcon line of low-voltage switches at the April 23-28 Spring Fair in San Diego. They had displays at their own booth, and also in the show's "Master Exhibit" which displayed "rough-ins" of various stages of building construction set up to show all installations.

► Stan Bixley recently was appointed vice-president and general manager for Day-Brite Lighting Inc. of California. His offices will be located in Santa Ana.

► Agencies Inc. of Los Angeles has increased its facilities from 7,000 to 20,000 sq ft. The space was added in order to handle additional items in the Hatfield Wire & Cable line which Agencies Inc. is now stocking. The company also announced plans to open its own show and sales meeting rooms in the Los Angeles area, and expects the new facility to go into operation within the next 60 days.

► John K. Gossland has been appointed executive vice-president and general manager of Electromation Co. Inc. of Santa Monica, according to James M. Johnson, president. Johnson also announced the appointment of Glen McClure as chief engineer. Coincidental with these two appointments, Johnson reported the March 15th acquisition by Electromation Co. of Westronics Co., a Los Angeles firm specializing in laboratory testing of microwave and related electronic equipment. Westronics will continue its work in the electronic testing field as a division of Electromation.

► Alvin Reitman, promotion manager for the Los Angeles branch office of General Electric's Lamp Division, was in Cleveland April 10-15, working with the company's advertising agency to complete sales promotion plans for the division during the remainder of 1957. Speaking of the company's present promotion of Coloramic lamps, Reitman said that the "Paint Your Home With Light" promotion has been a great success

in the southern California area. Since the first of the year the region has sold 25% of the country's output on color lamps. (If you will excuse the pun, things seem to be "in the pink" so far as color lamps are concerned.)

► Julian H. Davis recently announced the merger of Delta Electric Co. and Cliff Allen Electric Co., both of Los Angeles, under the new name of Delta-Cliff Allen Electric Co. Inc. Julian H. Davis will serve as secretary-treasurer and electrical engineer of the newly organized firm. Allen has taken over the firm's construction operations. The new company will specialize in industrial electrical engineering and contracting.

► Jack Rawlins of the Los Angeles Chapter, National Electrical Contractors Assn., says that an exchange of letters has recently taken place between his organization and union officials in which the Los Angeles NECA is listing the following items for negotiation: a 25c hourly wage increase, several health and welfare benefits, paid vacations, paid holidays and other fringe benefits. Other counties are asking just about the same terms, Rawlins said.

► Westinghouse Electric Corp. is building an 88,000-sq-ft plant on a seven-acre site in Compton. The new plant, which will house manufacturing and repair facilities for industrial electrical apparatus, will double present facilities. It will replace the firm's present plant in Huntington Park, and will employ some 200 persons when in operation in November.

► Alden C. Olsen is now representing Cannon Electric Co., Los Angeles, as the firm's distributor sales manager in charge of all jobber activities throughout the country. He succeeds Robert Davidson, now sales manager for Cannon's eastern division.

► Congratulations are in order for William S. Peterson, general manager and chief engineer for the Los Angeles Department of Water & Power. Peterson was named Electrical Engineer of the Year by the American Institute of Electrical Engineers.

► John Maddox Sales Co. of Los Angeles is now factory representative for all items in the Essex Rotary File & Tool line of carbide and high-speed tools. Stock will be shipped direct from New York. John Maddox also announced the addition of Ed Kramer to its staff.

What Makes RT&E Transformers Better?

OUTSTANDING BASIC DESIGN

Easy to Install... Operate... Maintain...

Every RT&E Transformer combines the result of years of industry progress with the experience and creative thinking of RT&E Engineers.

The result is a transformer that is low on losses, regulation and weight — high in impulse strength and overload capacity. A transformer thoroughly tested for top performance.

RT&E Transformers are designed and built to the highest standards. A dependable product, produced by a dependable company and backed by a full five year guarantee!

RT&E CORPORATION
WAUKESHA, WISCONSIN

OUTSTANDING BASIC DESIGN — *Another reason why* **RT&E** *is better!*

ACSR **that can meet or exceed your toughest requirements. Put Kaiser Aluminum's growing leadership in extra high-voltage research to work for you today!**

Triplex —combining three wires in one compact assembly—makes possible neater services, fewer attachments, easier installations—for big savings.

Power Cable that eliminated 26 competitive cables in time periods of from zero to 2,509 hours of a High Ozone Attack test—then went on to 6,000 hours.

Weatherproof —One of the nation's leaders in covered conductor, Kaiser Aluminum supplies the finest distribution, secondary and service cable in the field.

AAAC, developed and introduced by Kaiser Aluminum! Gives greater strength in high conductivities and is stronger than All Aluminum Conductor.

IF IT CARRIES CURRENT

KW CARRIES IT!

Now! Unsurpassed benefits for electric utilities due to Kaiser Aluminum's recent purchase of the Wire and Cable Division of U. S. Rubber, located at Bristol, Rhode Island!

Now from one source, you get all the established KW products plus all products of the new Bristol mill (formerly Wire and Cable Division of U.S. Rubber). For former U.S. Rubber products, the same quality insulations and product guarantee terms will be continued.

Now from one source, you get the most advanced technical assistance in the industry—the full cooperation of the research and development leaders of both aluminum and copper conductors.

Now from one source, better-than-ever service—from two plant locations (Newark, Ohio and Bristol, Rhode Island). This includes service from the production, engineering, sales and distributor organizations of both Kaiser Wire and the former Wire and Cable Division of U.S. Rubber.

For immediate attention to any request for electrical conductor products, engineering and research service, or further information, contact your nearest Kaiser Aluminum sales office or the KW distributor listed in your telephone directory.

Kaiser Aluminum & Chemical Sales, Inc., *Executive Office*, Kaiser Building, Oakland 12, California; *General Sales Office*, Palmolive Building, Chicago 11, Illinois.

Kaiser Aluminum

the bright star of metals

See "THE KAISER ALUMINUM HOUR." Alternate Tuesdays, NBC Network. Consult your local TV listing.

Portable Cord that gives you three times longer life than the average of molded cords of other makes. It's *proved* by 12,000 tests over a 3-year period.

Portable Cable: "It's the toughest, most flexible trailing cable we've ever used in our mines," says general superintendent of coal mining company.

Control Cable, backed by 67 years of experience in electrical wire and cable manufacturing. That means dependability—*proved security* for public safety!

Service Entrance Cable, now UL-approved for 75° wet applications! Improved design characteristics include pleasing appearance and ease of application.

PRODUCT NEWS

New Designs and Applications

New Luminaire

(1) *Wheeler Reflector Co., Street Lighting Department, 275 Congress St., Boston, Mass.*

Physical construction and optical principle both are different in this company's new low-brightness, directional luminaire for one-way or divided highway installation. The luminaire accommodates either mercury or incandescent lamps. Lamp is placed inside one of three diffusing globes in an upright position. Globe designs are said to meet code requirements for types I, II, III and IV light distributions, and have ventilation and insect proofing incorporated in the design. The level of the luminaire is adjustable vertically through a total angle of 20° to meet light distribution specifications. Among advantages listed for the luminaire are: glare reduction, optical control, more light output and flexibility of application. The luminaire body consists of two semicircular structural arches of aluminum joined by a curved aluminum body sheet. Reflectors are twin-shell plastic parabolic domes sandwiching a permanent layer of highly specular aluminum placed on the plastic by the vacuum metallizing process. Total weight of the luminaire is 55 lb.

Stenciling Ink

(2) *Reynolds Ink Inc., 4500 Euclid Ave., Cleveland 3, Ohio*

Packaged in aerosol containers, this company's inks are now available for such electrical applications as distribution transformer ratings and numbers, phase identification in color for substations and many others. Available in nine colors, the inks are said to be weatherproof and waterproof.

Decorator Switch

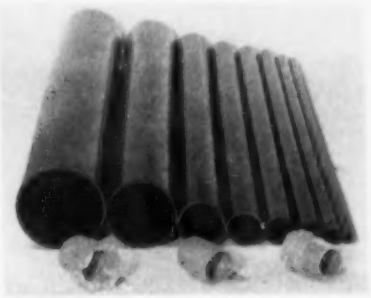
(3) *Minneapolis-Honeywell Regulator Co., Home Products Division, Freeport, Ill.*

This company's Tap-Lite switches are available with a clown face for children's rooms, and also with inserts in four different colors to match or harmonize with wall colors in other rooms. The inserts can also be used as patterns for cutting matching wallpaper inserts. Inserts are placed behind a transparent Plexiglas cover. Switches can be installed on normal house current without special wiring. Actuator button requires only a gentle tap to turn lights on and off.

Toggle Bridle Ring

(4) *U. S. Expansion Bolt Co., York, Pa.*

This company has added a toggle bridle ring to its line of masonry anchors and fasteners. Said to simplify installation of conduit and wiring.



Plastic Conduit

(5) *Amco Plastic Pipe Co., 2002 Davis St., San Leandro, Calif.*

Rubberized styrene copolymer is used by this company to make a new plastic conduit. Weighing one-eighth as much as steel, the conduit is said to be able to withstand extreme physical, electrical and thermal shock. It is shipped in 20-ft lengths and is joined by several couplings or adaptors by a watertight solvent weld. Available in sizes from ½ in. to 4 in. diameter.

Use Coupon for More Information . . . ——— **. . . See Page 32**

Dual Voltage Transformers

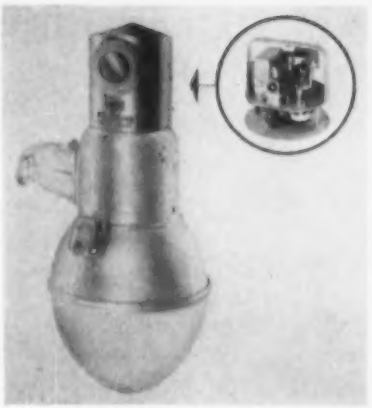
(6) *RT&E Corp., Waukesha, Wis.*

An externally operated switch on these new transformers permits a quick change on systems that are expected to be operated at higher voltages. Transformers are available in sizes from 10 through 167 kva with primary voltage combinations of 2,400x4,800, 2,400x7,200, 4,800x14,440 and 7,200x14,400. Available with standard secondary voltages. Insulated for highest name-plate voltage.

Voltage Regulator

(7) *Line Material Industries, 700 W. Michigan, Milwaukee 1, Wis.*

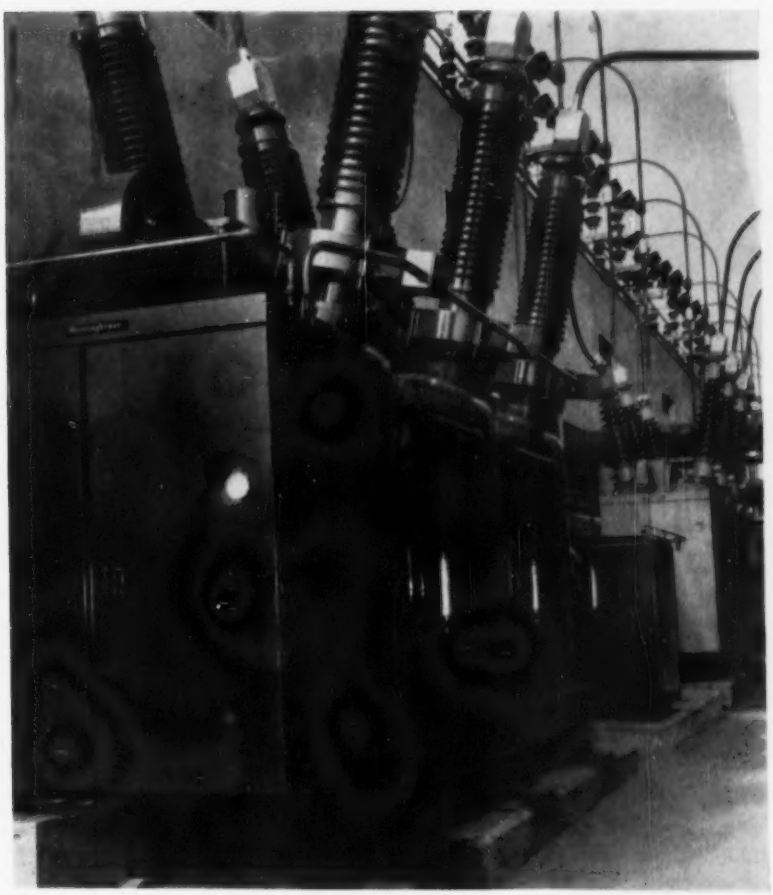
A new pole-type, single-phase voltage regulator made by this company operates over the range plus or minus 10% in 32 steps of 5/8%. The type RSD regulator has externally adjustable limit switches and can operate at 160% rated current at a 5% limit setting. Available in 2,500-, 5,000- and 7,620-v classes for application on circuits rated 2,400/4,160 through 7,960/13,800 v wye. Load current ratings, depending on voltage classes, are 25, 50, 75, 100, 150 and 200 amp.



Street Light Control

(8) *Ripley Co., Inc., Middleton, Conn.*

A weatherproof aluminum housing, a one-tube circuit with crystal photo-cell and positive flip-flop action are some features of this new street and highway light control. Turn on range is adjustable from 1 to 5 f-c. Load capacity of the unit is 1,000 w at 115 v a-c. Said to be adaptable to installation on luminaire, pole or crossarm, ballast, pole top, standard mast arm or replacement chassis for existing photoelectric luminaires.

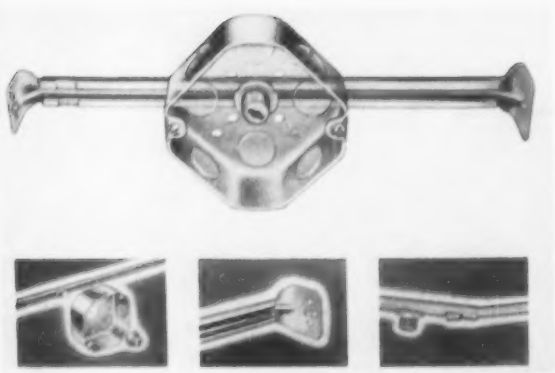


THE FIRST dead tank, high capacity outdoor compressed air circuit breaker ever built is installed at the Jamaica station of Consolidated Edison Co. of New York. The new 138-kv breaker, designed and manufactured by Westinghouse Electric Corp., has a normal current rating of 1,600 amp, interrupting rating of 10,000,000 kva.

Aluminum Connectors

(9) *Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.*

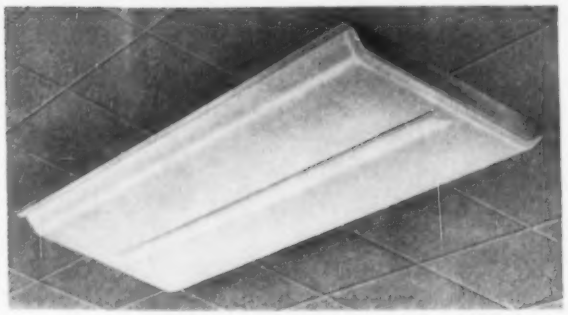
Reduction in conductor clamp inventories is said to be possible by use of this new series of U-bolt clamps. The heavy-duty clamps are designed to be used on a wide range of cable sizes. Six clamp sizes can handle ACSR from No. 2 to 715.5 mcm, and will also handle sizes No. 2 to 800 mcm stranded aluminum.



Expandable Bar Hangers

(10) *Appleton Electric Co.*, 1742 *Wellington Ave., Chicago* 13, *Ill.*

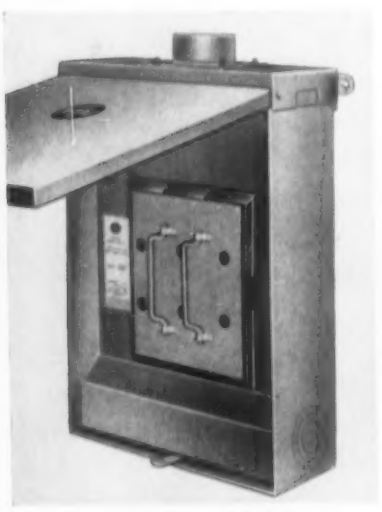
These new expandable bar hangers feature a concealed "nail" prong on the ends of each hanger that can be tapped with a hammer to hold the hanger to studding for final fastening.



Shallow Fixture

(12) *Sunbeam Lighting Co.*, 777 *E. 14th Place, Los Angeles* 21, *Calif.*

This company's newest surface-mounted luminaire is a luminous structural element with an apparent depth of only 2¼ in. The width of the unit, 24 in., conceals the ballast housing above rather than within the fixture. The Plexiglas diffuser wraps around the fixture, forming the sides and a portion of the ends. Side rails serve as both hinge and latch for the panel.



200-Amp Pullout Switches

(11) *Federal Pacific Electric Co.*, 50 *Paris St., Newark* 1, *N. J.*

A new line of 200-amp dead front pullout switches for use in the meter-switch-fuse sequence for 120/240-v, three-wire, single-phase and 240-v, four-wire, three-phase service is announced by this company. Switches feature reversible puller heads, a cutaway window in the fuse block to indicate "on" and "off" positions, fuse block guide slots, spring loaded fuse holders and elimination of hinged joints. Available in general purpose, flush or surface and NEMA III enclosures. Equipped with interchangeable adjustable hubs in sizes ¾ in. to 2 in.

Insulated Crane Hook

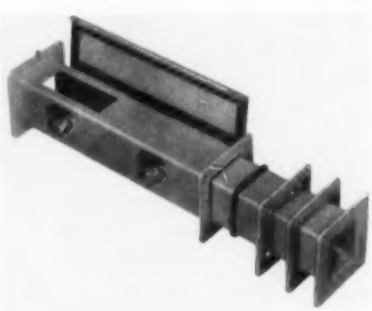
(13) *General Machine & Welding Works Inc.*, 1100 *E. Second St., Pomona, Calif.*

This company has developed an insulating link that is said to help eliminate the possibility of electrocution in crane accidents. The insulating links are placed between the lift hook and cable, providing insulation said to be capable of withstanding 100,000 v. Crane booms or load lines accidently contacting energized power lines can no longer cause death or serious injury to crews handling the load, according to the manufacturer. Available in 6.8-ton and 8.5-ton sizes.

Service Entrance Equipment

(14) *General Switch Corp.*, 45 *Roebling St., Brooklyn* 11, *N. Y.*

A new service entrance panel of this company is designed to provide a low-cost 200-amp multiple service disconnect for residential and commercial applications. It is a six-subdivision, 200-amp panel with main line lugs that will accept up to 4/0 AWG wire. It provides, too, four 30-or 60-amp major appliance pullout switches bused in parallel. An independent 30-amp pullout switch is for off-peak water heater application. A sixth parallel bused 100-amp fuse pullout switch is the main lighting disconnect and controls 18 single-pole plug fuse lighting small appliance circuits as well as a pair of 200-v subfeed lugs.



Telescoping Fittings

(15) *Hoffman Engineering Corp., Anoka, Minn.*

Incorporated into a wireway run, this telescoping wireway section permits adjustment to any desired length. Designed for use on machinery or in buildings where oil and dust are problems. Available in 2½x2½-in., 4x4-in. and 6x6-in. sizes. The telescoping section for each of the three wireway sizes is 15½ in. long and permits adjusting the length of an assembly between 1½ in. and 13½ in.

Plug-in Circuit Breakers

(16) *General Electric Co., Circuit Protective Devices Department, Plainville, Conn.*

Compact 240-v plug-in circuit breakers, half the size of conventional E-frame, are now available from this manufacturer for applications on lighting and power circuits from 15 to 50 amp.

I've yet to see 1 panelboard that can do 3 jobs right —at the right price!

That's why Square D makes 3 ...and you can get ALL of them off-the-shelf from your Electrical Distributor

JOB #1

Primarily to provide **lighting** circuits with provision for incidental power circuits. (15 to 50 amperes; 1, 2 and 3 poles; 240 volts)

JOB #2

Primarily to provide **power** circuits with provision for incidental lighting circuits. (15 to 100 amperes; 1, 2, and 3 poles; 240 volts)

JOB #3

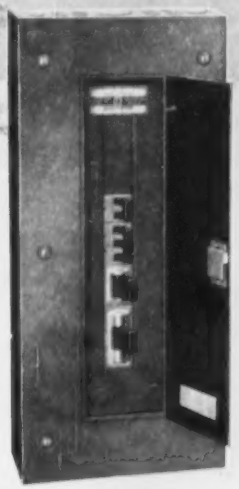
Exclusively to provide power and heavy branch feeders. (30 to 600 amperes; 2 and 3 poles; 250 and 600 volts)

NQO
LIGHTING PANELBOARD

New 3-Pole Breaker

Sequence bussing plus new 3-pole breakers permit power circuits in addition to lighting circuits within bus capacity of 200 amperes maximum

MHP
POWER PANELBOARD



Bus capacity to 400 amperes for heavier power circuits, plus provision for *balanced* lighting circuits

QMB
POWER PANELBOARD

Quick-make, quick-break branches of heavy-duty construction to 600 amperes

With Square D's three U.L. approved lines, there's no need to over-buy or under-buy to get your job done. Write for the complete Panelboard story...
Address Square D Company, 4335 Valley Boulevard, Los Angeles 32, California

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE

SQUARE D COMPANY

Voltmeter

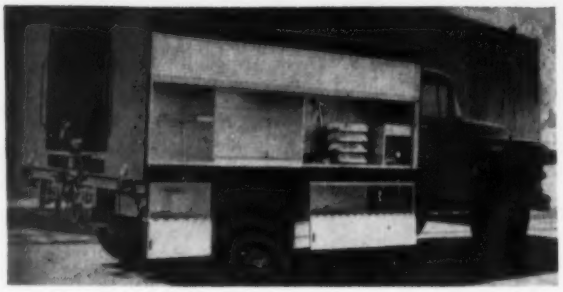
(17) *Phaostron Instrument & Electronic Co., 151 Pasadena Ave., South Pasadena, Calif.*

Readability is emphasized in a new line of expanded scale voltmeters offered by this company. Can be supplied for either a-c or d-c. Illustrated is the voltmeter designed for line voltage measurements which has an expanded scale 90 to 130 a-c rms. It is available in nine case styles.

Suspension Insulator

(18) *General Electric Co., Insulator Department, Box 57, Baltimore 3, Md.*

This insulator design is based on a new, stronger porcelain body developed by the manufacturer. It is rated at 25,000-lb mechanical and electrical strength, though its dimensions are comparable to the ASA standard 15,000-lb insulator. It has doubled impact strength with a 20% reduction in weight.



Service Truck Doors

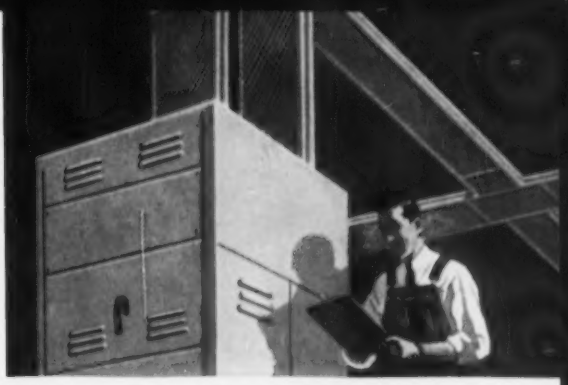
(20) *Cookson Co., 1525 Cortland Ave., San Francisco 10, Calif.*

Extruded aluminum rolling doors, extending the full length of the body on each side, are said to give easy access to tool and equipment compartments.

Lighting System

(19) *Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.*

A new ceiling lighting system that permits the creation of a wide variety of custom designs from a few standard parts has been introduced by this company. Called "Sylva-Lume," the new system is a modular, interchangeable plastic panel system for wall-to-wall fluorescent ceiling lighting. Six components are: an extruded aluminum track system supported to the ceiling, 3-ft square contoured vinyl plastic diffusers, acoustic wedges or baffles, flat steel perimeter units, a new "outrigger" fixture and lamps.



Exclusive Lo-X Scarf-lap Construction provides rigidity and strength. Tailored lengths overlap and bolt together easily. Elbows, tees and cross sections permit installation to fit specific plant layouts.

The BullDog field engineer stands ready with the detailed information you and your plant engineers may need to plan an efficient power network for new or existing facilities. Take advantage of his know-how in your planning.

Aluminum Lo-X—low-cost key to electrical efficiency!

Leading industrial plants everywhere are using BullDog aluminum Lo-X feeder duct as a vital part of their electrical distribution systems. Invariably—this leads to increased electrical efficiency and savings right down the line.

First savings come with the initial investment in space-saving Lo-X BUStribution® duct! The lightweight, prefabricated aluminum sections cost less to buy—less to install. Next, current-carrying costs are the lowest possible . . . maintenance is reduced to almost nothing. Finally, reusable Lo-X can be relocated without loss if needs change. Consult your BullDog field engineer —see how a complete BullDog system, from safety switches to complete distribution systems, can be your key to real electrical efficiency and economy.

© BEPCO

IF IT'S NEW . . . IF IT'S DIFFERENT . . . IF IT'S BETTER . . . IT'S

BULLDOG

ELECTRIC PRODUCTS COMPANY

A DIVISION OF I-T-E CIRCUIT BREAKER COMPANY

BullDog Electric Products Company, Detroit 32, Michigan • A Division of I-T-E Circuit Breaker Company • *Export Division:* 13 East 40th St., New York 16, N. Y. • *In Canada:* BullDog Electric Products Company (Canada), Ltd., 80 Clayson Rd., Toronto 15, Ontario.

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

COAST ELECTRIC & MANUFACTURING CO.
1733 N.E. Seventh Avenue, P.O. Box 7712
Portland 12, Oregon

YOUNG ELECTRIC & MFG. CO.
2134 Curtis St.
Denver 2, Colorado

SAFETY SWITCHBOARD COMPANY
910—89th Avenue
Oakland 21, California

BULLDOG ELEC. PROD. CO. OF LOS ANGELES
2885 E. Washington Blvd.
Los Angeles 23, California

Inside story of the grids that made the giant

NOW AT RATINGS DOWN TO 69 KV

The Westinghouse tubular, multi-break interrupter, only two years ago, made possible the world's first 330-kv, 25-million-kva circuit breaker.

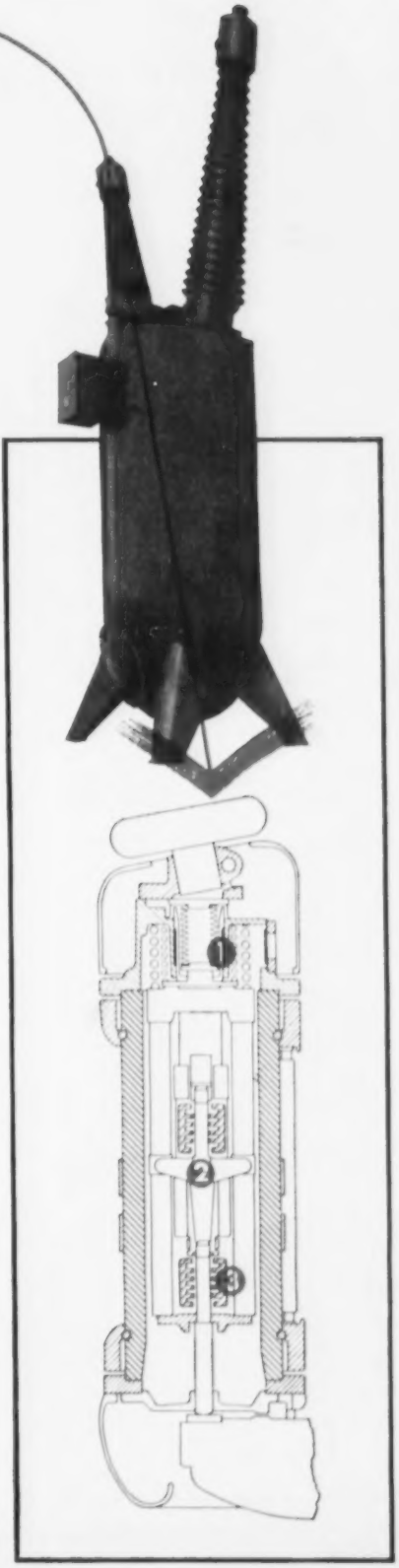
Now, this same tubular interrupter is applied to breaker ratings of 69 kv (3½ million and 5 million kva), 138 kv (10 million kva), 161 kv (15 million kva) and 230 kv (15 million kva).

Another big plus is the extremely simple inspection and maintenance procedure. Interrupter blocks—two to eight per pole—may be removed by loosening only a few MICARTA® bolts. With the blocks removed, both the stationary fingers and the moving contacts are visible. They can be replaced, if necessary, with the tubular shell still mounted on the bushing—without loss of contact alignment. Interrupter blocks are identical in all ratings from 69 kv through 330 kv. Contacts and fingers for ratings above 138 kv are also interchangeable. Spare parts inventory is reduced to a minimum.

Tubular multi-break grids provide excellent line-dropping and capacitor-switching characteristics—proved in laboratory and field tests. The integral oil-driving piston assures fast extinction of low-current arcs. Grids are simple to install—and in some instances can be added to existing breakers. All the details are available from your Westinghouse sales representative—or you may write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa., for descriptive literature. J-60912

YOU CAN BE SURE...IF IT'S

Westinghouse



Sectional view at left shows interrupter top casting assembly with ① oil driving pump, ② contact assemblies, ③ fibre interrupter blocks and other essential design features.

INDIANA STEEL & WIRE CO. MUNCIE IND.
Crapo Galvanizing
Signs along the lines of
Crapo GALVANIZED STEEL STRAND PERFORMANCE
For dependable performance . . . insist upon Crapo Galvanized Steel Strand. Superior tensile strength, combined with long-life, ruggedness and workability, makes Crapo Steel Strand first choice for guys, messenger and overhead ground wire.
The famous Crapo galvanizing process provides dependable protection for the steel, prolongs the expectant life of the strand.
• Low maintenance cost
• Laboratory tested and controlled quality
• Meets highest quality standards
• A size and grade for all practical needs
• Contact your Crapo Jobber Today!
INDIANA
STEEL & WIRE CO., INC.
Muncie, Indiana

Specialists IN INDOOR-OUTDOOR ENCLOSURES, SWITCHES AND TEST BLOCKS
KNIFE-TYPE, REMOVABLE LINK & SLIDE-A-LINK SWITCHES
Makers of the safe, sturdy, compact,
Roto-Test
2 POSITION TRANSFER OR CONTROL SWITCH
WRITE FOR LATEST BULLETINS
METER DEVICES COMPANY
1001 Prospect Ave. S.W.
CANTON, 6, OHIO

BULLETINS ETC.

(21) COOLING TOWER CONTROL — This four-page bulletin discusses a newly patented system for automatically controlling make-up water flow, chemical feed and blowdown rate of cooling towers. Request bulletin 1050 from Bailey Meter Co., 1050 Ivanhoe Road, Cleveland 10, Ohio.

(22) TEMPERATURE CONTROL — Barber-Colman Co., 1400 Rock St., Rockford, Ill., is presenting a booklet devoted to what is referred to as an entirely new concept in automatic temperature control. It discusses the functions, uses and advantages of centralized automatic control with visual supervision of the entire heating and air conditioning system.

(23) STORY OF ELECTRICITY — A new booklet entitled "My Teacher's Got Me Stuck" is available from Westinghouse Electric Corp. Written and illustrated in comic book format, the booklet is intended for distribution by electric utilities to homes, factories, businesses and as a service to school groups and youth organizations. Comforts, conveniences and luxuries made possible by electricity are emphasized.

(24) FIRST AID AND PROTECTION—First aid and field protection advice and detailed information on unit system first aid kits and components are included in a new general catalog published by Medical Supply Co., Rockford, Ill.

(25) HOME LIGHTING—A new booklet on home lighting, "Bright Ideas for Brighter Living," is available from Sylvania Electric Products Inc. It features a theme of "decorate with light" and includes exterior lighting ideas as well as interiors. Photos and sketches illustrate the ideas. Write to the company at 1100 Main St., Buffalo 9, N. Y.

(26) A 32-page illustrated catalog on manufacture, use and care of Charleston Rubber Co. rubber gloves and sleeves has been made available to the electric utility and industrial electrical fields. A list of technical reports is included in the catalog. Address of the company is Stark Industrial Park, Charleston, S. C.

(27) CORROSION CONTROL—"Corrosion Control for Electric Light and Power Companies" is the title of a semitechnical brochure containing recommendations for the application of paint products to electric equipment. Available from James B. Sipe & Co., Industrial Division, Pittsburgh 16, Pa.

(28) FIRE PROTECTION—Planning of fire protection for structures and equipment associated with power generation and transmission is aided by this 12-page illustrated bulletin available from the "Automatic" Sprinkler Corp. of America, Youngstown, Ohio. A foldout chart gives specifications and applications of water spray, mechanical foam and dry chemical systems.

(29) LIGHTING GUIDE — Sylvania Electric Products Inc. is offering a new incandescent lighting guide book for commercial, industrial and residential lamp users. It covers more than 1,800 types and sizes of incandescent lamps in 24 pages. It is described as "a convenient source of reference on the indispensable incandescent light bulb." Address is 1100 Main St., Buffalo 9, N. Y.

(30) TIME SWITCHES — M. H. Rhoades Inc., 40 Bartholomew Ave., Hartford, Conn., is offering illustrated catalog sheet BX-197-1 on its Mark-Time 9000 series time switch. It lists and illustrates typical uses and shows in chart form the 12 standard switches and their timing cycles.

KILL TWO BIRDS WITH ONE STONE—Fill out this coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST
68 Post St., San Francisco 4, Calif.

Not good after July 1

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

If described in advertising, fill in page number

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NAME ..... TITLE .....

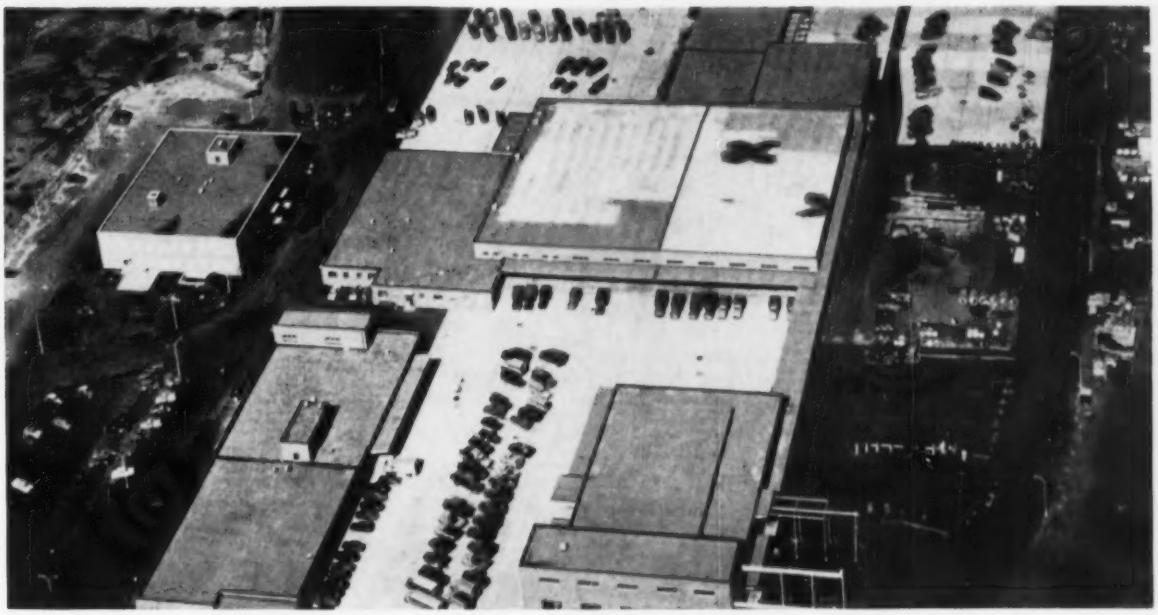
COMPANY .....

ADDRESS .....

CITY ..... ZONE ..... STATE .....

*Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

HOW BELL SYSTEM COMMUNICATIONS SERVE THE POWER INDUSTRY



LILCO's "77 acres of service" at Hicksville—the first atom-age service center—complete from spare parts and weather service to feeding and sleeping accommodations.

Private line channels form nerve system for first atom-age control center in U.S.

Bell System communications help make the Hicksville headquarters of Long Island Lighting Co. self-sustaining. First of its kind in the U. S., the center can control the supply of power to 1½ million people under emergency conditions.

From the underground control center, System Operators control the load at seven generating stations. They also trip and close power switches and monitor the operation of 29 remote substations. This finger-tip control is accomplished entirely over Bell System private line channels.

• • •

Modern communications can give your own operations the same kind of speed, efficiency—the kind that provides good customer service. Just call your Bell Telephone Company business office. A representative will be glad to make a thorough study of your needs.

BELL TELEPHONE SYSTEM

PRIVATE LINE TELEPHONE • PRIVATE LINE TELETYPEWRITER CHANNELS FOR: DATA TRANSMISSION • REMOTE METERING AND CONTROL • TELEPHOTOGRAPH • CLOSED CIRCUIT TV

"Our supervisory control system lets us do just about everything at plants and substations but sweep up"—O. H. Nauman, chief system operator.

LILCO's continuous 68 ft. system control board was designed to provide better supervision of an area whose population has jumped 50% in four years, and to function efficiently in time of major disaster.

New Dayton Daily News Building Gets Life-time Wiring Protection With

YOUNGSTOWN "BUCKEYE" STEEL CONDUIT

Electrical wiring system in the new Dayton Daily News Building will be permanently safe from damaging elements such as water, moisture, vapor, dust and dirt because Youngstown's Full Weight Rigid Steel "Buckeye Conduit is on the job 24 hours a day—every day.

If the safe and efficient operation of your electrcial systems—in any location— poses a problem, then Youngstown "Buckeye" Conduit should be your specification. Field reports relate: "It's easier to bend and thread—easier to fish wires through and because of its superior corrosion resistance, provides a much longer, trouble-free service life."

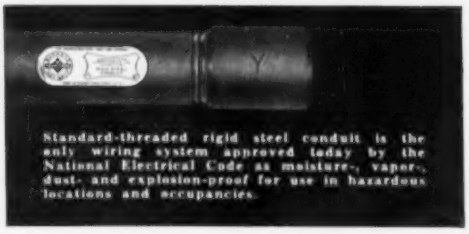
Remember, because Youngstown is the only producer of rigid steel conduit controlling all processes from ore mining to finish threading, you can be certain each length contains the same high quality that has made it the accepted standard of leading owners, architects and contractors everywhere.

Our Distributor's complete and ample stocks will help keep your jobs on schedule—and cover emergency needs whenever they arise. Why not call today for prompt and efficient handling of your next conduit order.

Dayton Daily News Building, Dayton, Ohio
Design and construction by The Austin Company, Cleveland, Ohio
Electrical Contractor: The Wagner-Smith Company, Dayton, Ohio
Conduit Supplier: Westinghouse Electric Supply Co., Dayton, Ohio

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities



Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

MAY 1957

ELECTRICAL WEST SALES GUIDE News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

West has five winners

Five Western utilities were given awards at the Edison Electric Institute annual sales conference in Chicago last month. They were: Idaho Power, residential lighting promotion; Pacific Gas and Electric and its home economics director, Marguerite Fenner, the Laura McCall Award; San Diego Gas & Electric, Better Light, Better Sight; Southern California Edison and Washington Water Power, George A. Hughes cooking awards.

A good story well told

Utah Power & Light Co. recently changed its rate schedule to permit use of quick recovery water heaters, and its home service director, Evelyn Hansen, has prepared a clever presentation for this equipment. As she tells the advantages of quick recovery units, she makes her story more understandable by using a flannelboard. Wording and illustrations are clever yet simple to make and use. The board itself is the right size to carry in an automobile and to set up easily. Pictures and details of this presentation will be carried later, with a story on the Whopper range and water heater campaign.

Lighting workshop repeated

Success of the home lighting workshop sponsored jointly by Arizona Public Service and Arizona State College at Tempe two years ago has brought a repeat. Running June 3-7, the classes will cover almost every aspect of home lighting and feature a group of informed instructors headed by Myrtle Fahsbender, Westinghouse. Co-chairmen are Bryon G. Payne, residential sales supervisor for the company at Phoenix, and Dr. Jessie M. Rannels of the college. Enrollment of 75 is expected.

Out to sell ranges

Southern California Edison has started an intensive new drive to sell electric ranges. Eight meetings to launch the campaign had an average attendance of 200 dealers...Department of Water & Power has announced its advertising program for an April-May range campaign.

Box score winner

Hotpoint has been tabulating utility load building in commercial cooking equipment. Idaho Power was in top place for 1956, with 6,364 kw added in 12 months. Total new commercial kw added by the company in 1956 was 35,077, according to W. R. Reed, commercial and industrial sales supervisor.

Their case is wolfproof

Idaho Power wants its salesmen to be armed with facts—the tools to build a "wolfproof sales case that won't be blown down by just so much hot air." Therefore with natural gas coming into its area, it held gas training schools for its sales and other key people. In the school and the reference manual, a factual story on fuels was given and the electric people were made ready to answer customer questions on all fuels. They were given a preview of gas selling points. R. J. O'Connor, residential and farm supervisor, who conducted the schools, did not forget to hammer home a few old truths on selling itself. Colored slides illustrated and emphasized the presentation.

Show even better

Portland's Home Show closed a 10-day run in early April with 90,000 paid admissions, 48% better than last year. Operation Home Improvement was the principal feature. The electrical fraternity got an all-electric kitchen in the model home; the gas company got the heating. Electrical exhibitors mostly emphasized wiring, partly to take advantage of Housepower and Live Better... Electrically advertising and partly to educate the public to the new 200-amp entrance requirement in the Portland code. The two power companies had separate exhibits. Portland GE showed its prize winning model home; Pacific P&L had a wiring board for demonstrating how easy it is to build up load in the home from 30 to 60 to 100 to 200 amp. Nick Mason handled PGE's booth; Joe Liebrich, Pacific's.

Display space helps promotions

Public Service Co. of Colorado is making available its showrooms to all distributors in the Denver area for the special appliance promotions being conducted this year by Rocky Mountain Electrical League. Sixteen distributors displayed washers, dryers and combinations during the "Modern Laundry" promotion in February and March. Twenty distributors took over the showrooms for the April-May promotion on "Built-ins for Modern Planning." These featured cabinets, dishwashers and disposers. At least that many distributors are planning to have displays for the June-July promotion—"Air Conditioning for Comfortable Living." League promotions are keyed to letters V-P with the theme: "Get Volume Profit From Vital Promotions."

Bonus money

Portland GE is breaking a new promotion to stimulate range and water heater sales. Up to $50 is offered to customers who either replaced or buy new ranges and water heaters under varying conditions. This is called bonus money over and above the trade-in value of the purchaser's present equipment and it varies with the age and condition of the equipment replaced. All sales are through dealers, of course.

Financing extended

Also being launched is a series of dealer meetings in Pacific P&L territory to point out ways local dealers can cash in on the big national promotion of Live Better...Electrically and Housepower. Pacific is extending its wiring financing plan and tying it in with this presentation.

Why it was the best

One Montana newspaper said: "We have all kinds of 'weeks,' but the best and most important was Electrical Week." That's because C. J. Burns, vice-president, Montana Power Co., appointed D. J. McGonigle, general sales manager, as coordinator of the event and Dee went about the job in his usual workmanlike manner. He appointed a "power-loaded" committee of executive assistants, advertising and publicity people, division managers and his own sales crew, and they developed and executed the plan for newspaper stories, advertising, speeches, use of radio and TV, in fact all normal promotion media. Few people in the state failed to learn something about electricity and Housepower.

Sales training

Preparing for 1957 promotional activities, commercial and industrial salesmen of Utah Power & Light held a two-day conference in Salt Lake during March. The opening session, chairmanned by Homer Shaw, commercial director, featured a cooking demonstration at Dohrmann Hotel Supply Co. with George Klopp, Hotpoint, giving the selling points. Other speakers included Ted R. Brown, manager, Refrigeration Distributors Corp., on the heat pump and air conditioning; G. B. Buck, G-E Lamp Division, on light sources and getting more for your money; P. W. Smith, Westinghouse, outdoor floodlighting; William Brown, consulting engineer, lighting and air conditioning for Walker Bank & Trust; Jack Lowder, Stevens Sales Co., light for selling.

How and what to wash

The electric industry was well represented at the California Home Economics Assn. biennial held in San Francisco, April 13-15, with Marguerite Fenner, PG and E, as chairman. Electric laundry equipment took the spotlight at the concluding luncheon as Nancy Johnson, Westinghouse regional home economist, and some 15 models from the group showed California clothes for carefree living. How to handle various fabrics, what not to wash and how to choose clothes for washability were just some of the pointers the women received as they saw the latest in California fashions. Present at the back of the stage were an automatic washer and dryer and both were put to work to help with the presentation. Among the models from the industry were Betty Smith, Frigidaire, Mary Kelly, Philco, Cleo Filsinger, Esther Day and Kay Moon, PG and E. And modeling again, and again almost stealing the show, were Roger and the twins Nan and Jan Moon, children of Kay Moon.

Frank Falge's monthly progress report on

LIVE BETTER . . . *Electrically*

"Something Wonderful Happens"

"Something Wonderful Happens," new Live Better... Electrically film, was previewed before an enthusiastic audience at the EEI sales conference in Chicago, April 3. Films may be ordered now.

Calendar goes to yearly basis

The EEI Residential Promotional Calendar, which has been so widely adopted by utilities and related associations including Live Better...Electrically, will now be operated on a yearly basis and will be published in the early summer of 1957 it was announced at the Chicago conference.

More sales—greater profits

An attractive booklet by Hotpoint "shows you how to tie in with Live Better...Electrically for more sales—greater profits." It spells out Live Better...Electrically and what it can do for dealers.

Another LBE women's conference

Following a most successful Live Better...Electrically Women's Conference in Chicago in January, it has been announced there will be a second one at the Edgewater Beach Hotel in Chicago next year.

A real time saver

A hot food server by Toastmaster Products Division of McGraw-Edison Co. is one of the newest electrical devices that can be built into new or old kitchens to keep food warm up to six hours.

Farm Better Electrically

Farm Better Electrically is the theme of the forthcoming EEI farm development program, it was announced at the sales conference. The emblem resembles Live Better...Electrically but features a barn and motor instead of a family.

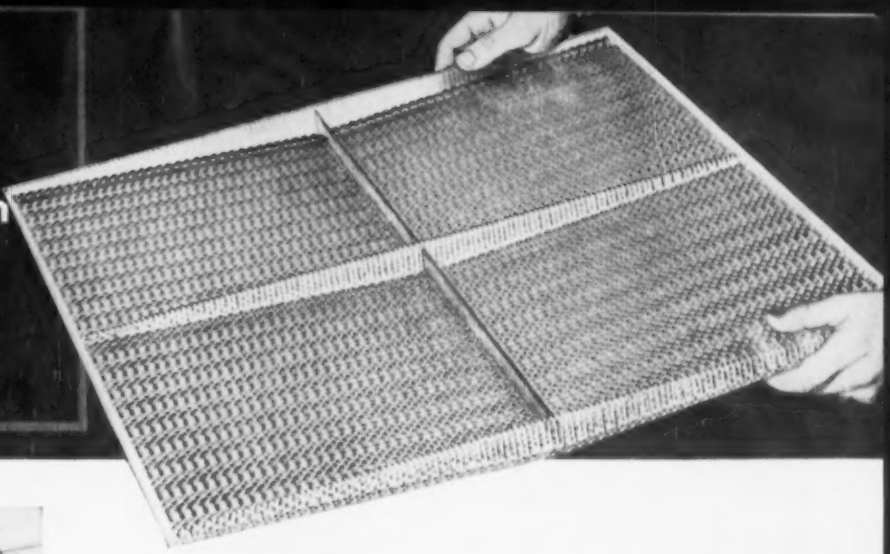
Contest

NEMA announces the second Rural Home Electrical Load Building Contest to run through Jan. 20, 1958.

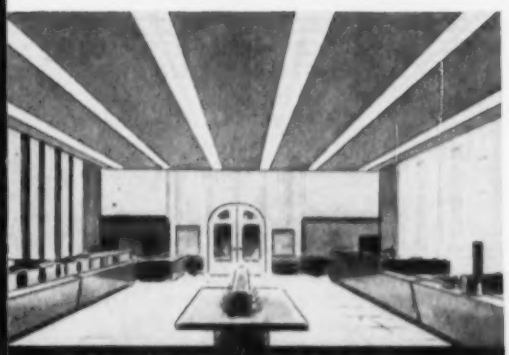
Identify homes with full HOUSEPOWER

Homes that are adequately wired for Living Better ...Electrically need suitable identification because people today know and appreciate the value of such homes. In Wichita, Kan., bronze certification emblems were awarded to homes that qualified and these emblems were mounted at the entrance to the homes, in the concrete at the entrance, etc. Curtis Development & Manufacturing Co. of Milwaukee has found a great demand for the illuminated house number that incorporates Full Housepower and an Adequate Wiring emblem.

HOLOPHANE ENGINEERS Break Through the GLARE BARRIER...



No. 6024 in large ceiling panels; effective lighting for executive offices.



In 2-foot-wide troffers; emphasizing spaciousness of the bank interior.

Small and large panels in the store ceiling; excellent illumination for seeing and selling.

Prismalume* Controlens* No. 6024 Introduces New Concepts in Fluorescent Light Control

There's a new trend in lighting — heralded by this two-foot-square HOLOPHANE CONTROLENS*. . . It produces the highest illumination with complete visual comfort! With your first step into an interior illuminated by this CONTROLENS you sense that something new and stimulating has been achieved with the lighting . . .

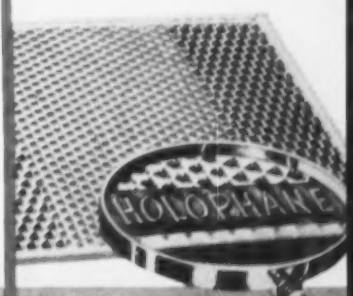
Due to prismatic control, maximum light is delivered on the work plane. This CONTROLENS can be used in two-foot-wide troffers (continuous runs), geometric groupings, or large luminous panels . . . Its sleek, handsome design conforms with the modern decor of offices, banks, stores, lobbies, showrooms, auditoriums and an unlimited variety of other areas. Write for complete engineering data today.

For Better Lighting Holophane *... Be Specific*

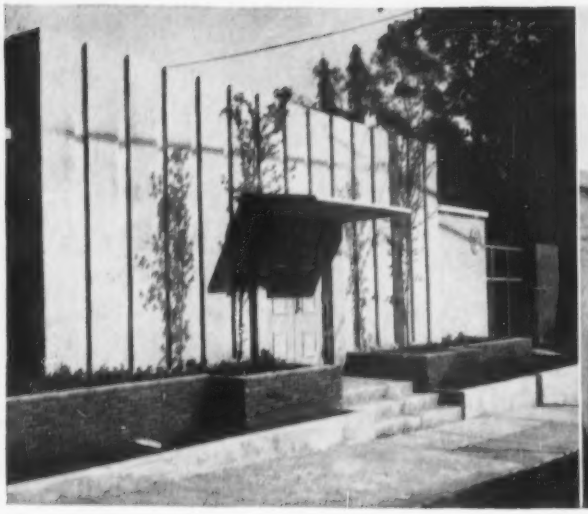
*Trademark

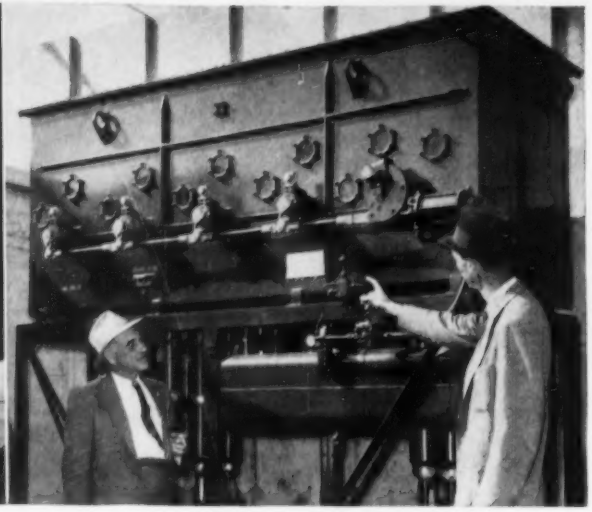
The Name HOLOPHANE *is your Surest Guide to Lighting* QUALITY

High-speed pressing and rolling are cost-cutting ways of making prismatic panels—acceptable only where quality is unimportant . . . This is definitely *not* the Holophane method. Every HOLOPHANE lens is carefully and *individually* pressed on specialized equipment. Only by this painstaking process can we make prismatic forms accurate enough to direct light precisely where it is needed. HOLOPHANE Lenses are the basic components of *custom-engineered* illumination systems, specifically designed for each lighting requirement . . . To be sure of quality in prismatic CONTROLENS* Refractors or Reflectors, look for the name "HOLOPHANE" impressed on each piece.



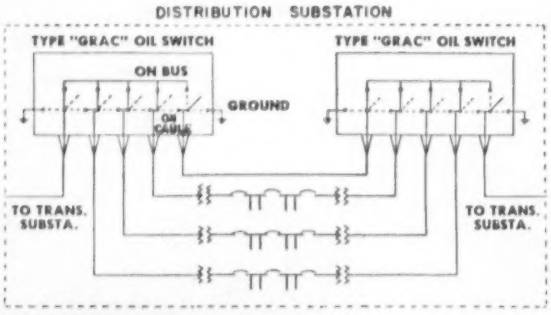
HOLOPHANE
COMPANY, INC. • *Lighting Authorities Since 1898*
342 Madison Ave., New York 17, N.Y.
THE HOLOPHANE CO., LTD., 410 KIPLING AVE. SO., TORONTO 14, ONTARIO

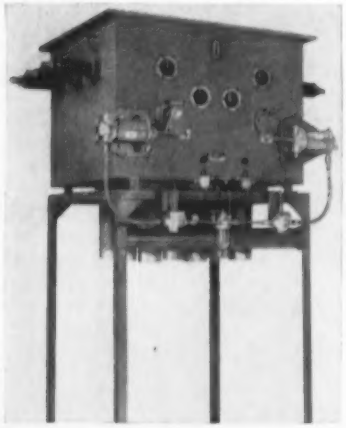




LOAD BREAK SWITCHING F-L-E-X-I-B-I-L-I-T-Y FOR 34.5 Kv. CIRCUITS

A large municipal utility installs a complete substation on a small city lot. Reduces maintenance to a minimum by eliminating all exposed buses, disconnects, etc. by using G & W Type "GRAC" oil switches.





Type "TGRAL" oil switch 3 way, 2 sets of links, 34.5 Kv. 400 ampere, full load break—with two pneumatic operating mechanisms. This and other styles of Type "RA" load break oil switches are available to provide safe sectionalizing at all voltages up to 34.5 Kv.

The G & W Type "GRAC" oil switches are 5 way, 34,500 volts, 400 amperes, with buses and 5 sets of switching links. The outer "ways" of each switch are for the feeder and feeder-tie cables and the three center "ways" are for cables to the load transformers.

A pneumatic mechanism, with manual control, provides for full 400 ampere load break at 34.5 Kv. Switching, therefore, can be done at the distribution substation without opening the circuit breakers at the transmission substations, which are located up to five miles away.

The oil switches and the feeder-tie cables facilitate energizing both ends of the double ended unit transformer stations from only one of the transmission substations during emergency conditions.

Ground positions for the two outer "ways" of each oil switch permit grounding the feeder and the feeder-tie cables. The center tap cables can be grounded also, by switching to the "ON CABLE" positions.

The one pneumatic mechanism on each switch is used for operating any of the five sets of links, by inserting a pin in the proper lever.

All switch cableheads are for single conductor gas filled cable stubs which are spliced to three conductor gas filled cables.

Send for series "D" bulletins. Get in touch with our nearest representative.

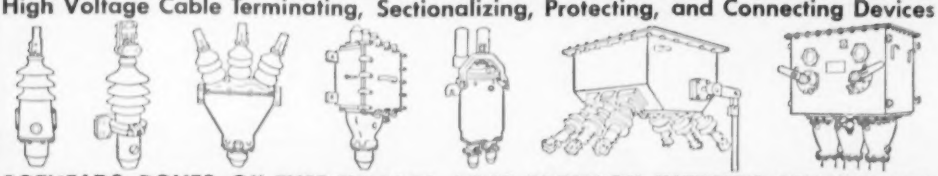
G & W ELECTRIC SPECIALTY COMPANY
3500 W. 127th ST., BLUE ISLAND, ILLINOIS

D575

Representatives in many cities of U. S. A., N. & S. America — Canadian Mfr. — Powerlite Devices, Ltd., Toronto, Montreal & Vancouver

G&W

High Voltage Cable Terminating, Sectionalizing, Protecting, and Connecting Devices



POTHEADS • BOXES • OIL FUSE CUTOUTS • LOAD BREAK OIL SWITCHES • SPLICING KITS

NEW MD5 HYTOOL

lightweight champ with a heavyweight punch!

Jaw variations make this the versatile, durable tool you can afford to put on every truck. Low in cost, big in performance this new 4¾ lb. MD5 delivers a 6000 lb. force to install a range of distribution connectors on all conductors through 2/0 ACSR.

It's designed to stand the roughest field treatment. Jaws are of heat treated steel. A set screw adjustment compensates for wear. Die letters or numbers on each groove correspond to connector markings to assure correct crimping. Handle grips color-coded for easy identification.

Your Burndy representative will be glad to demonstrate the advantages of the MD5.

MD5 HYTOOL Installs Hysplices on #4, #2, 1/0 and 2/0 ACSR
Aluminum up thru 1/0, copper up thru #2 and
Crimpits, Eltaps, Linkits, etc. up thru 1/0

BURNDY

56-14

Norwalk, Connect. • Toronto, Canada • Other Factories: New York, Calif., Toronto • Export: Philips Export Corp.

An answer for every electric utility

A PLANNED OUTAGE IS NO OUTAGE

Five hundred kw is not a large unit of power by utility standards. Not, that is, unless it is badly needed . . . and not available.

That's why more and more utilities are finding an increasing number of uses for the Electro-Mobile 500 kw highway-trailer generating unit. It can go anywhere, pick up a load in minutes, permit construction or maintenance crews to work without interrupting service to customers.

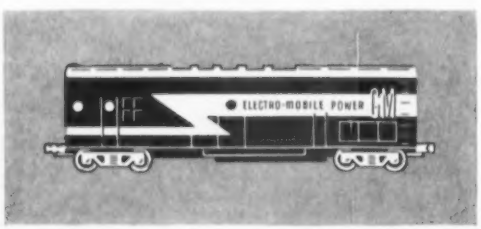
In addition, Electro-Mobile Power offers an immediate source of emergency power to areas that might otherwise be without service for a long period of time. Used in multiple, there is no limit to the amount of power these units can supply.

The savings from Electro-Mobile Power are many. Rebuilding or maintenance work of any duration can be handled during regular working hours. Work goes faster, in greater safety, and most important—customer relations and income are maintained during the temporary outage.

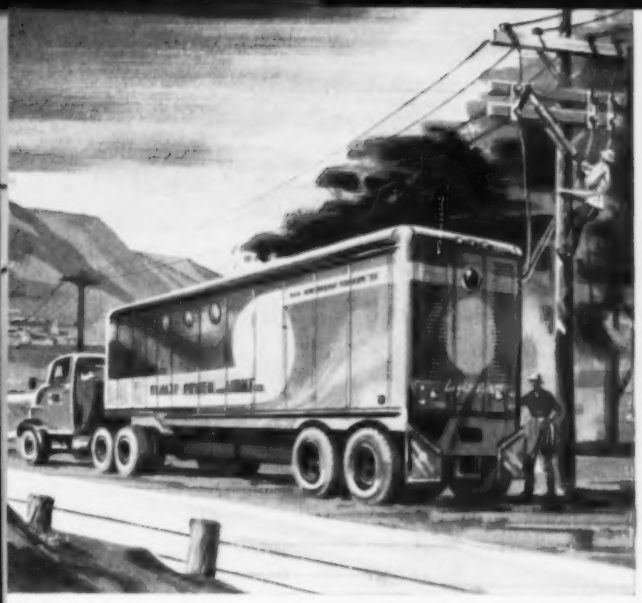
A planned outage is no outage with Electro-Mobile Power. Its many advantages are helping to reduce costs and improve service for many utilities. It can do the same for your system. Your Electro-Motive representative will be glad to show you how.

Here's how one Midwestern utility company uses its Electro-Mobile trailer . . .

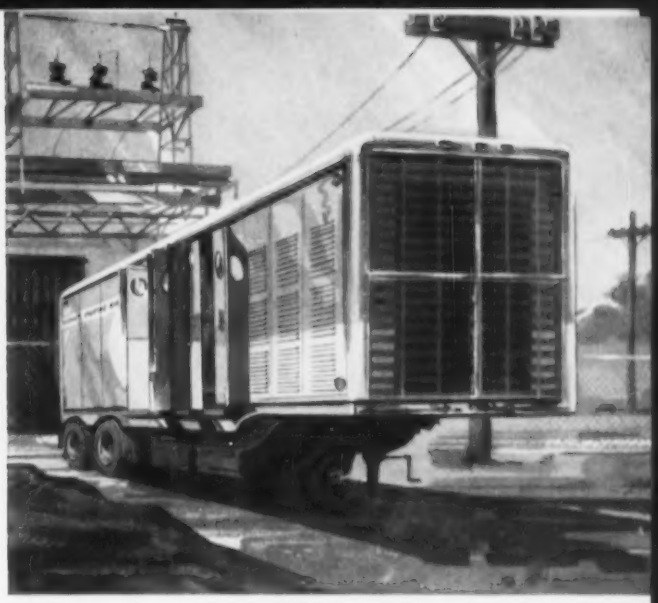
In a span of twelve months, this utility used its Electro-Mobile trailer on fifteen different jobs. Shown here are some examples of the work completed and in progress with this unit. During the year the mobile trailer was operated over 340 hours. On one job alone, it was used 145 hours, delivering 58,500 KWH.



Rail Car—develops 1,000 kw. For use on rail sidings or placed on piers for semi-permanent installation.

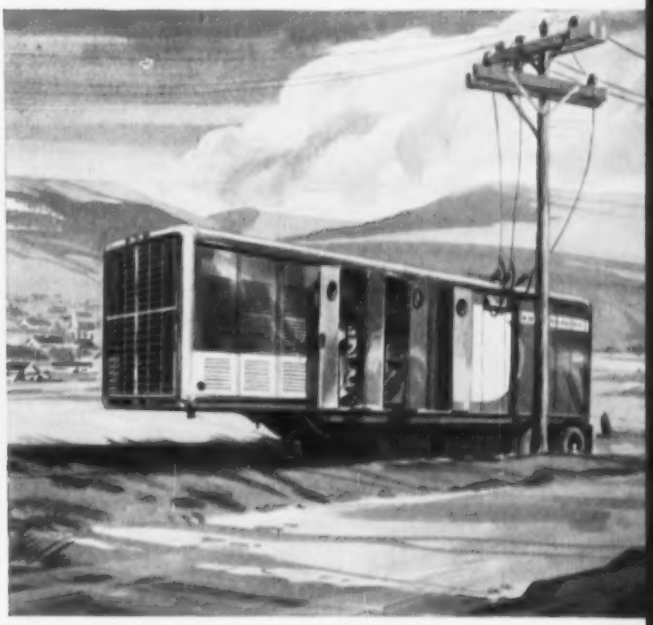


Relocating 12,400-volt line for new highway.
Hours used: 68 ¼ KWH generated: 22,700



Installation of new transformer for substation.
Hours used: 3 ½ KWH generated: 1,100

Feeding 12,400-volt sub-transmission line while stringing new conductors on transmission line.
Hours used: 145 KWH generated: 58,500



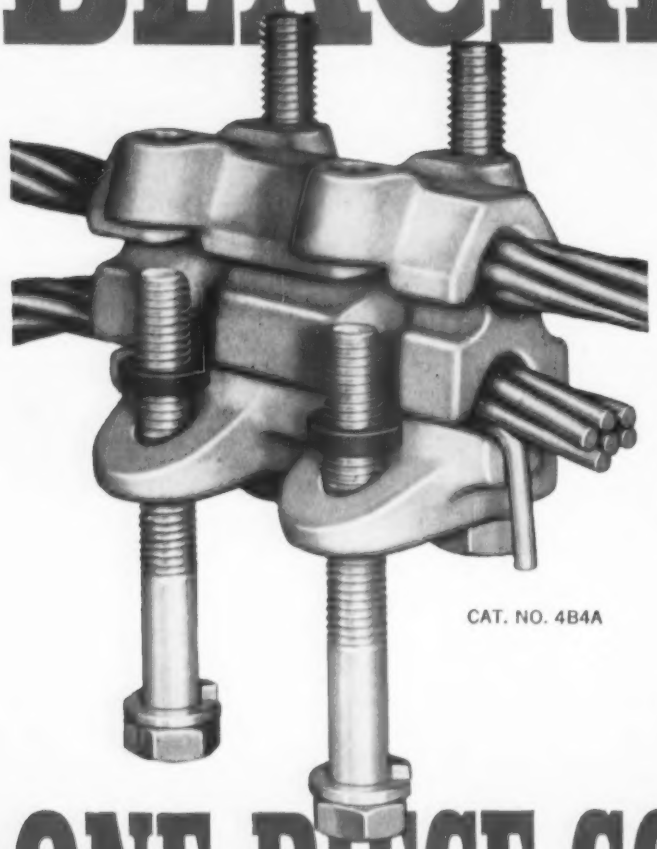
Handling daily peaks while existing transmission line and substation are being rebuilt.
Hours used: daily average 4

ELECTRO-MOTIVE DIVISION
GENERAL MOTORS
LA GRANGE, ILLINOIS

Sales Offices in Chicago, New York, St. Louis, San Francisco

It's New! Installs quicker...easier

BLACKBURN



CAT. NO. 4B4A

It's here... a heavy duty one-piece 4-bolt connector with all the electrical and mechanical advantages of a U-bolt connector... yet much easier to install.

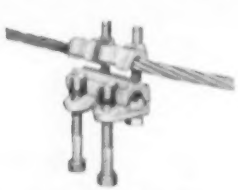
No bothersome nuts, washers, housings, spacer to take apart and assemble. Just three quick, easy steps and installation is completed.

Housings are of non-copper-bearing aluminum alloy. Spacer of soft aluminum pig protects conductor, aids conductivity. Spacer treated with heavy coating of oxide inhibiting compound. Hardware is high strength aluminum alloy completely alumilited to prevent seizing.

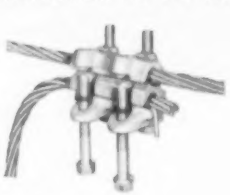
WIDE RANGE..
Accommodates conductors—2/0 to 397.5 ACSR—3/0 to 477 MCM

ONE-PIECE CONNECTOR

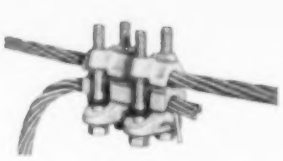
HERE'S HOW EASY THE NEW 4-BOLT CONNECTOR IS TO INSTALL



Unscrew the two free bolts contained with neoprene washers and hang over main.



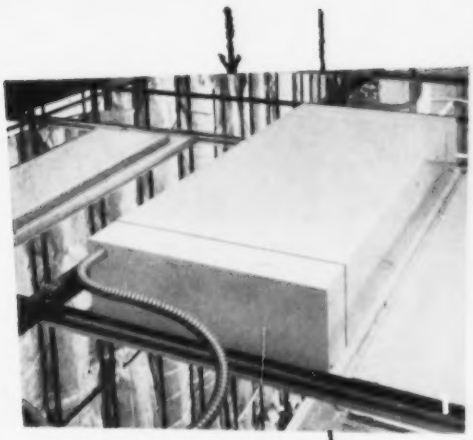
Insert tap wire.

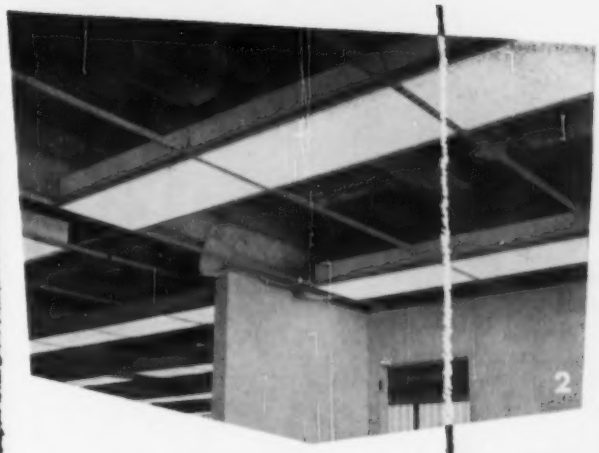


Tighten and you have the ultimate in a good connection.

Available through electrical wholesalers everywhere

JASPER BLACKBURN CORPORATION
ST. LOUIS, MISSOURI

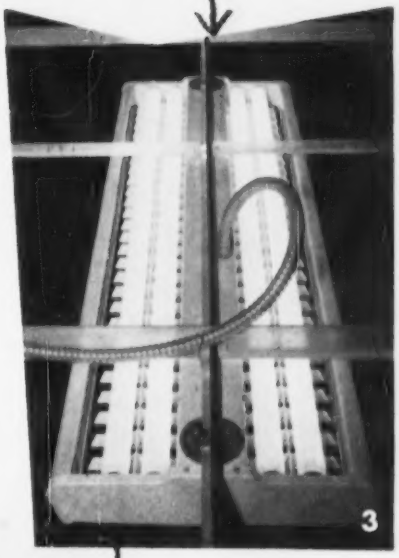




MORE SUNBEAM LIGHTING GOES UP AS CEILING HEIGHTS COME DOWN

In keeping with the modern trend toward lower and more functional ceiling arrangements, Sunbeam Lighting Visionaires® prove their adaptability and flexibility daily. New ceiling construction methods are kept under constant study by our engineers so that maximum versatility and simplicity of installation are designed into every fixture. Our recessed, "large area" 3600 series, for instance (photos 1 and 2), are as easily installed or relocated within suspended ceiling systems as the acoustical panels themselves. Other units, such as the standard 5600 series troffers, are adaptable to a wide range of installation requirements including suspended, "snap-in" T-bar mounting (photo 4).

Our newly developed CSM7 hanger for "surface mounting" of luminaires directly onto suspended ceiling runners eliminates the need for separate and costly hanging systems (photo 3). Every effort is made to construct Sunbeam Visionaires® so that they may be installed and maintained with minimum use of tools.



Remember, for the ultimate in shallow, surface-mounted fixtures, it's the SHALLORAMA!

SUNBEAM visionaire

SUNBEAM LIGHTING COMPANY
777 East 14th Place, Los Angeles 21, California

Your Circuits Need the of KEARNEY

close coordination through precision-matched time-current characteristics

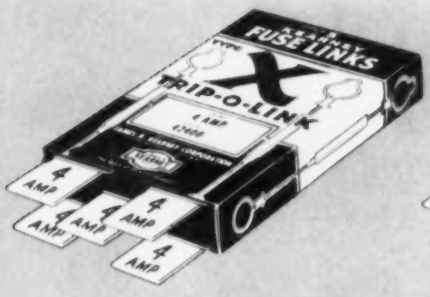
KEARNEY TYPE KS
Specialized to protect equipment, minimize outages on circuits subject to switching and lightning surges. Provides extra high surge protection without sacrificing overload capacity.

Easy Handling! Patented KEARNEY Pul-Tab Fuse Pak makes it easy for linemen to pull out the right fuse. All Fuse-Paks are color-coded, with clear markings, for quick stockroom selection.

for BETTER CONSTRUCTION
SAFER MAINTENANCE
Specify KEARNEY
JAMES R. KEARNEY
The Mark of Quality PRODUCTS

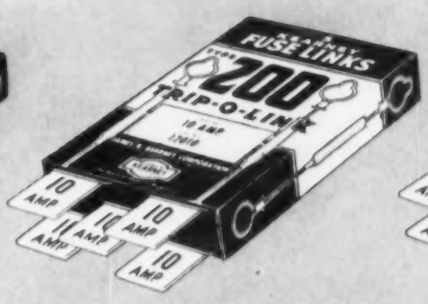
Field-Proved Protection

Specialized **FUSE LINKS**



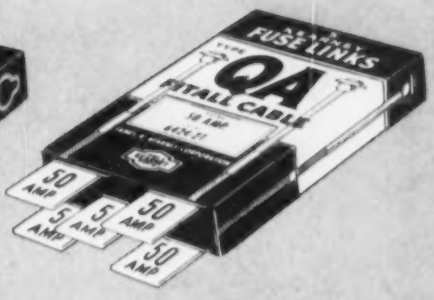
KEARNEY TYPE X

Specialized to maintain transformer service during heavy overloads and surges, yet clear the fault before damage range is reached. Opens 230% of rated current within five minutes.



KEARNEY TYPE 200

Specialized to protect troublesome circuits subject to overloads and surges of long duration. Carries overloads up to 150% indefinitely without damage to fuse link or cutout.



KEARNEY TYPE QA

Specialized to open at lower percentage of rated current, and consequently to melt more rapidly than fuse links of same amp. rating which are designed to open 230% of rated load within five minutes.

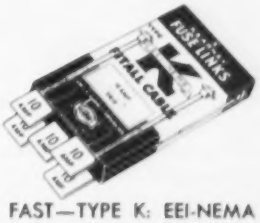
Get the accurate performance you expect—and pay for—with KEARNEY specialized Fuse Links. They're design-matched to today's safe loading curves... specialized so you can select the time-current characteristics to match your needs precisely. They're *field-proved* at KEARNEY's own substation laboratory, and on power lines throughout America.

For the *close coordination* that protects your equipment against overloads... protects your revenue against needless load dropping... specify KEARNEY. Contact your KEARNEY Representative for fusing recommendations based on your specific requirements.

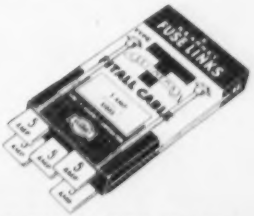
370-W

KEARNEY
Standard
FUSE LINKS

Give you the same field-proved accuracy and dependability.



FAST—TYPE K: EEI-NEMA standard fast fuse link



SLOW—TYPE T: EEI-NEMA standard slow fuse link

JAMES R. KEARNEY CORPORATION

General Offices: 4224-42 Clayton Ave., St. Louis 10, Mo.

Plants at: ST. LOUIS • FAYETTEVILLE, ARK.
SHENANDOAH & CLARINDA, IA. • GUELPH, ONT., CAN.

IN THE WEST: for prompt service, contact Kearney's West Coast Distributor, Maydwell and Hartzell, Inc., Los Angeles • Seattle • Portland • San Francisco • Spokane • Phoenix

Do you worry about power distribution problems

AT 3:00 A. M.?

If you have a power distribution system problem — either in an old building or in that new one you're planning — here's one way you can stop losing sleep over it. Just use Rockbestos A.V.C. (asbestos, varnished-cambric insulated) Interlocked Armored Cable. It will help you cut costs and at the same time assure you dependable service. Here's why:

- Rockbestos A.V.C. Interlocked Armored Cable gives you more current capacity than cable in conduit or other armored cable. Single conductors are standard N.E.C. Type AVA power cables.
- You save important dollars by eliminating the need for costly conduit or ducts.
- It's easily installed on racks or hangers beneath the ceiling or next to walls.
- It can be installed up, down or around walls, beams or posts.
- It cuts installation time and permits quick, easy repairs.

Get all the details on Rockbestos A.V.C. Interlocked Armored Cable — Write now for catalog which gives complete specifications and application data.

ROCKBESTOS PRODUCTS CORPORATION
NEW HAVEN 4, CONNECTICUT | NEW YORK, CLEVELAND, DETROIT, CHICAGO, PITTSBURGH, ST. LOUIS, LOS ANGELES, NEW ORLEANS, OAKLAND, SEATTLE

ROCKBESTOS

A. V. C. Interlocked Armored Cable

For New Buildings, Expanding Existing Circuits, Relocating Old Circuits

Precision-shaping POLE STAR cores keeps exciting current and core loss uniformly low

Pole Star distribution transformer cores are precisely shaped by "squeezing" the laminations between the outer, riveted lamination and a hydraulically inserted annealing block. Retention of this shape is assured by controlled-atmosphere annealing, after an outer annealing form has been placed around the core as shown.

After a Pole Star core is given its preliminary shape by forming dies, the outer lamination is riveted into position and an annealing block is inserted into the window of the core by means of the hydraulic press pictured above. By thus "squeezing" the laminations between the annealing block and the outer lamination, the core is precisely shaped in accordance with predetermined specifications for the particular size. The laminations, which had been cut to progressive lengths for telescoping of the individual pieces, are uniformly lapped.

Both the finished core shape and the uniform laps are figuratively "locked" in place by the stress annealing operation that follows. Annealing in controlled-atmosphere furnaces also insures retention of the inherent qualities of the grain-oriented steel. Any adhesions that may be formed during annealing are eliminated later, because laminations are separated from each other as they are placed in the coil and individually re-lapped.

Such rigidly controlled production means that the advantages of Pole Star's patented lap-on-top core are as consistent as they are outstanding. The individually lapped laminations create a large cross-section area at the lap that reduces the density and prevents a concentration of flux. The absence of gaps or butt joints assures a low exciting current. High interlamination resistance, plus the absence of adhesions, keeps core loss at a low value.

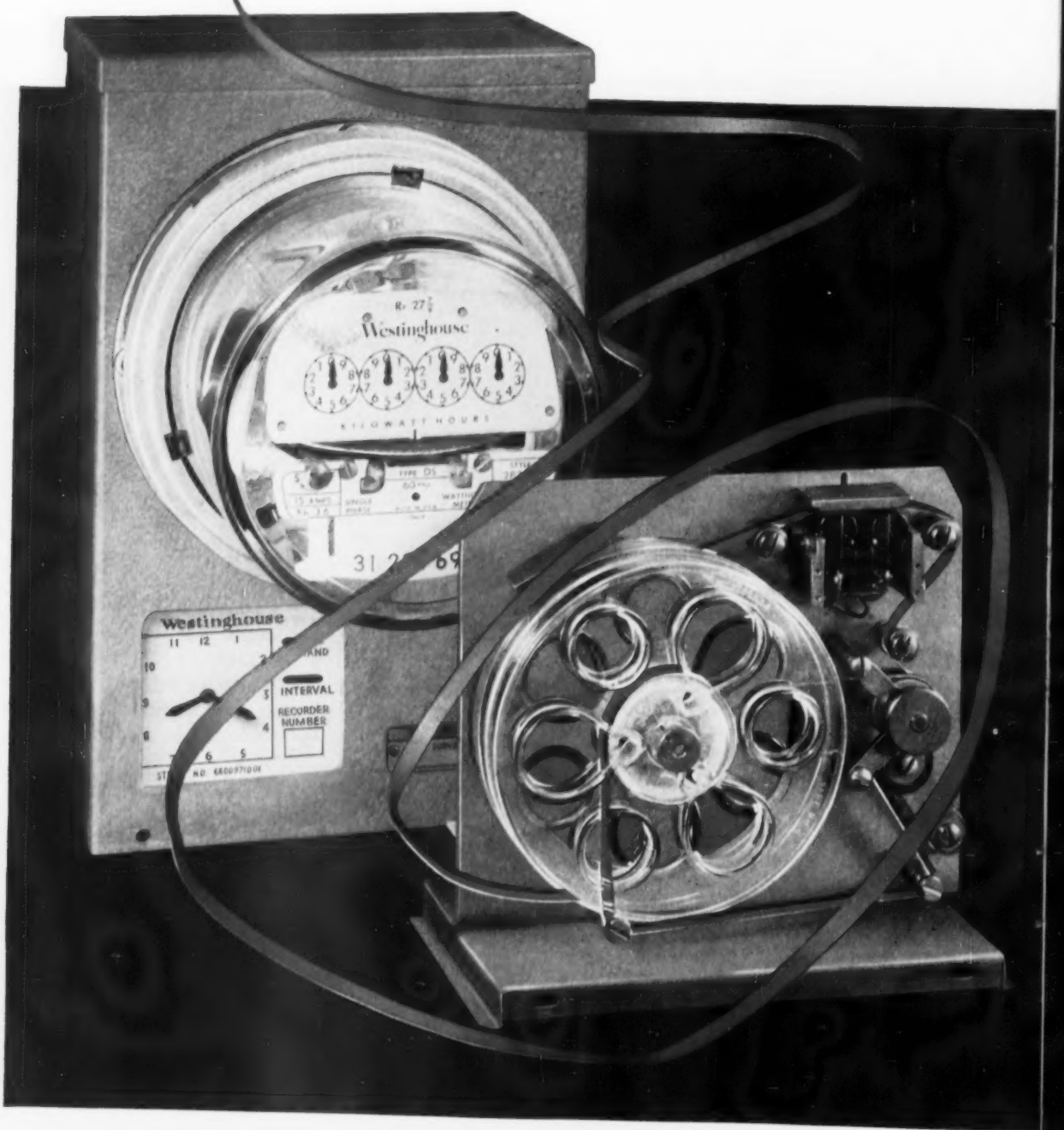
167 Production Controls make Pole Star Best!

3 through 500 kva, through 67,000 volts

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division **CANONSBURG, PA.** Greater Pittsburgh District

"Red Tape"


Westinghouse
KILOWATT HOURS
Westinghouse
INTERVAL
RECORDER NUMBER

saves you money

Exactly! It's magnetic recording tape in the new Westinghouse Load Survey Meter

The new Westinghouse Load Survey Meter uses the principle of automation. It gets the same results . . . higher production from fewer man-hours.

Essentially, the meter is a tape recorder that translates consumer demand indicated by the watthour meter into "intelligence" on the tape—at the maximum rate of 240 demand impulses per interval. The 600-foot tape runs a full 32 days. The tape then is "played back" through a special translator in conjunction with an IBM 526 Printing Summary Punch. In 35 minutes the translator and card punch can deliver a record for the month on punched and printed IBM cards. No engineers, clerks or card-punch operators are involved.

Compare this operation with current methods which require two interpreters for each six recording charts per day—plus an IBM operator—just to read the record and put it in usable form.

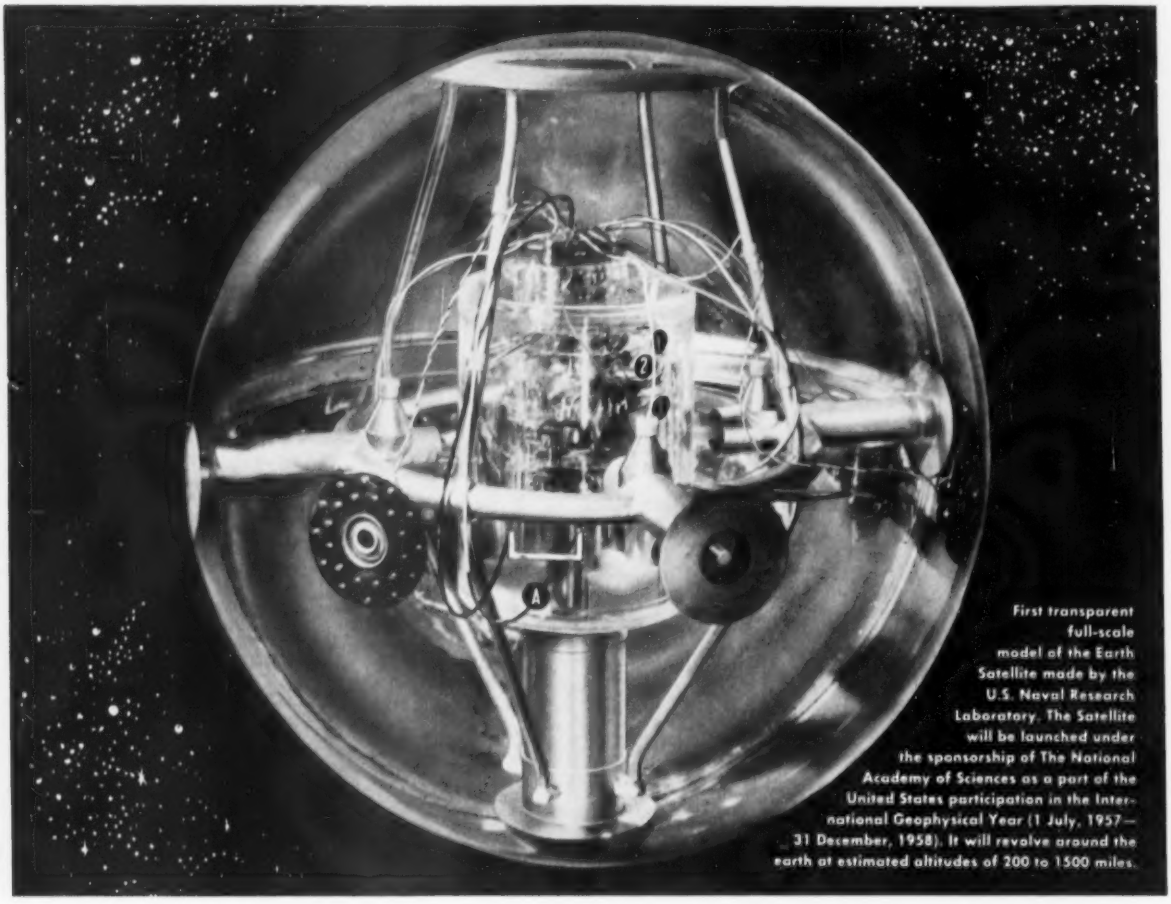
The new Westinghouse Load Survey Meter is a truly practical tool. It saves you money in the process of giving you accurate information on which to plan more efficient generation and distribution systems. Complete details are available from your Westinghouse sales engineer—or from Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh, Pennsylvania. J-40490

"Double unit, allowing customer's billing meter to remain in service (upper meter) while load is recorded by means of lower meter, which contains the contact device."

YOU CAN BE SURE...IF IT'S

Westinghouse

DRIVER-HARRIS ALLOYS AT WORK IN PRODUCT ADVANCEMENT



First transparent full-scale model of the Earth Satellite made by the U.S. Naval Research Laboratory. The Satellite will be launched under the sponsorship of The National Academy of Sciences as a part of the United States participation in the International Geophysical Year (1 July, 1957—31 December, 1958). It will revolve around the earth at estimated altitudes of 200 to 1500 miles.

How measure the impact of micro-meteorites on the first "Earth Satellite"?

When physicists at the U.S. Naval Research Laboratory consider an instrument or a material to record accurately the secrets of outer space—it's not size alone that counts, but dependable, reliable precision.

The strip of "Nichrome"* evaporated on glass ("A" in the photo above) which may be fitted to the outer skin of the Satellite, measures only ¼" wide x 1½" long. Its thickness: 100 Angstrom units (1/10,000 mm). Its function: to measure the surface erosion caused by the impact of micro-meteorites. The resistance of the Nichrome ribbon increases as the film becomes pitted by meteor particles.

"Nichrome is being considered for making this gage," states the Naval Research Laboratory, "because it supplies electrical resistance in a desirable range; adheres satisfactorily to glass in thin film form; and has a very low thermal coefficient of resistance."

There'll be no one on hand, 300 miles out in space, to check on or supervise the performance of the Nichrome strip. Nichrome needs no one. It will do its job dependably there—just as it will in *your* electronic or electrical equipment, after it is in your customers' hands.

And remember, Nichrome is only one of the 132 special purpose alloys developed by Driver-Harris since 1899 for electrical heating, resistance, and electronic applications. Do you need a special alloy? Send us your specifications.

*T. M. Reg. U. S. Pat. Off.

Driver-Harris COMPANY HARRISON, NEW JERSEY

Western Representatives: ANGUS-CAMPBELL, INC. • 4417 S. Soto St., Los Angeles 58 • 760 Tennessee St., San Francisco 7

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE, AND ELECTRONIC ALLOYS IN THE WORLD

The Best Costs Less Installed

EASY-TO-INSTALL Republic ELECTRUNITE E.M.T. provides for future wiring requirements. The exclusive knurled "ball-bearing" inside surface makes wire pulling and "fishing" up to 30% easier. Changing conductors at any time is a cinch.

West Islip High School, Suffolk County, N. Y. *Architect-Engineers:* Frederick P. Wiedersum, Valley Stream, N. Y. *Electrical Contractor:* ABC Electrical Contractors, N. Y. C.

UNIFORM DUCTILITY makes all sizes of REPUBLIC ELECTRUNITE E.M.T. easy to install

ACCURATE STUBS, smooth back-to-back and saddle bends, are easy to make with a Republic Bender, using the helpful "INCH-MARKED"® and "GUIDE-LINED" features. To cut Republic ELECTRUNITE E.M.T., an ordinary 32-tooth hacksaw will do the trick. Why not specify Republic on your next job and save on installation costs? Remember, the best costs less installed.

A lot of Republic ELECTRUNITE E.M.T. was installed in the new West Islip High School, largest in Suffolk County, New York. And regardless of size—¾", 1", or 2"—electricians found the bending characteristics the same. Smooth, uniform bends were made quickly and easily, with no costly kinks—thanks to the *uniform ductility* in every foot. And in the larger sizes—like 2"—it eliminated the need for elbows and extra fittings, a substantial savings in labor and materials.

You'll like to work with Republic ELECTRUNITE E.M.T. There are no threads to cut, no lines to turn. To make joints tight, you tighten the E.M.T. coupling or box connector, not the entire run. Try Republic ELECTRUNITE on your next job. Be sure to ask your electrical distributor for the E.M.T. that's "INCH-MARKED" and "GUIDE-LINED". Mail coupon for literature giving complete specifications.

REPUBLIC STEEL

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

REPUBLIC STEEL CORPORATION
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Gentlemen:

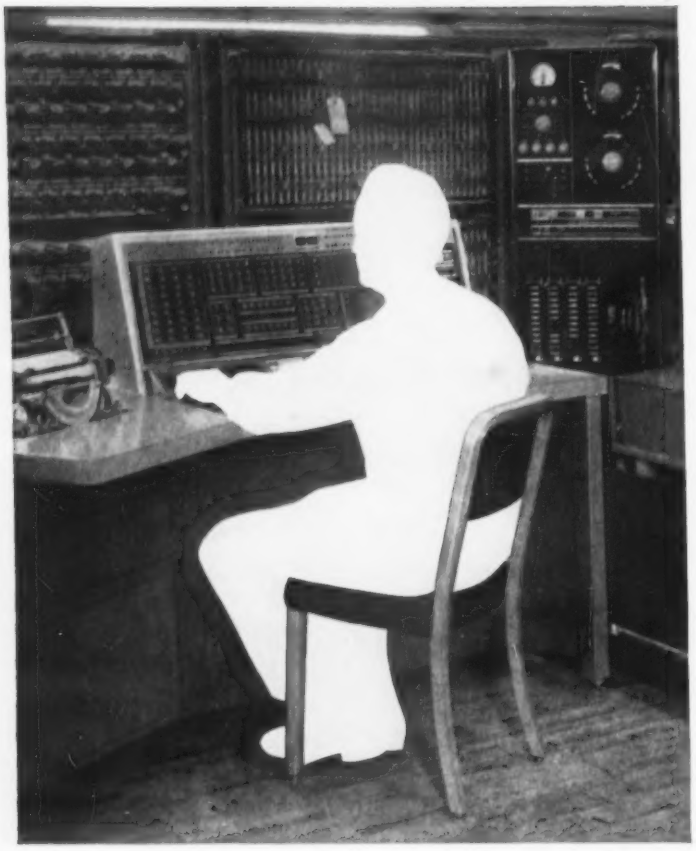
Please send me additional information on Republic ELECTRUNITE® "INCH-MARKED" E.M.T.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____



IBM growth promoted this man

Computer Programmer: Before his recent promotion, this man was a research programmer working with a giant IBM 704 electronic computer. He was engaged in the preparation of research problems of an engineering, scientific, business, and industrial nature for machine solution. His work entailed advanced diagnostic and application program development, including the modification of existing systems and proposed new systems. "This work has the same fascination as a game of chess," he'll tell you, "and the variety of constant challenges makes it absolutely absorbing!"

Positions now open at IBM—San Jose!

Jobs like these continually open up at IBM—due to rapid expansion. If you are an engineer or scientist—or have equivalent experience—you may qualify for such a position. Innumerable opportunities exist in:

- Computer systems planning
- Computer systems testing
- Electronic circuit design and packaging
- Electrostatic phenomena
- Manufacturing process control
- Numerical analysis and programming
- Photo and magnetic device memory
- Real time systems engineering
- Semi-conductor research, development and manufacturing
- Test equipment design

For the facts about an engineering career with IBM, just write, outlining background and interests, to:

R. A. Whitehorne
Mgr. of Engineering Recruitment, Department 11405
International Business Machines Corporation
590 Madison Avenue, New York 22, N. Y.

The electronic computer field offers one of the best ground-floor opportunities today. Economic experts rank it with automation and nucleonics in growth potential. Sales at IBM, the recognized leader in this fast-growing field, have doubled, on the average, every five years since 1930. Engineering laboratory personnel has quintupled in the past five years. IBM's excellent salaries and employee-benefit programs are instrumental in achieving an employee turnover rate far below the national average.

Where would <u>you</u> like to work for IBM?

IBM plants and laboratories are located in: Endicott, Kingston, New York City, Owego, Poughkeepsie, N. Y.; Burlington, Vt.; San Jose, Calif.; Washington, D. C.; Greencastle, Ind.; Lexington, Ky.; Rochester, Minn.; Sherman, Texas.

IBM DATA PROCESSING

DATA PROCESSING • ELECTRIC TYPEWRITERS • MILITARY PRODUCTS • SPECIAL ENGINEERING PRODUCTS • TIME EQUIPMENT

POWER PLANT SERVICES REPORT

Delaware Power & Light's new 50,000-kw plant hastened to completion in 18 months

One of the most recent and significant additions to the Delaware Valley's booming industrial area is Tidewater Oil Company's new, ultra-modern Delaware Flying A Refinery, nearing completion 15 miles south of Wilmington. This installation has the largest initial capacity of any refinery yet built, and, as such, requires large amounts of power and process steam to satisfy its operating demands.

To fulfill these requirements, it was necessary that the new Delaware City Power Station of Delaware Power & Light Company be finished to coincide with the completion of the refinery. This job — normally requiring two years — was accomplished from inception to completion in a remarkable 18 months.

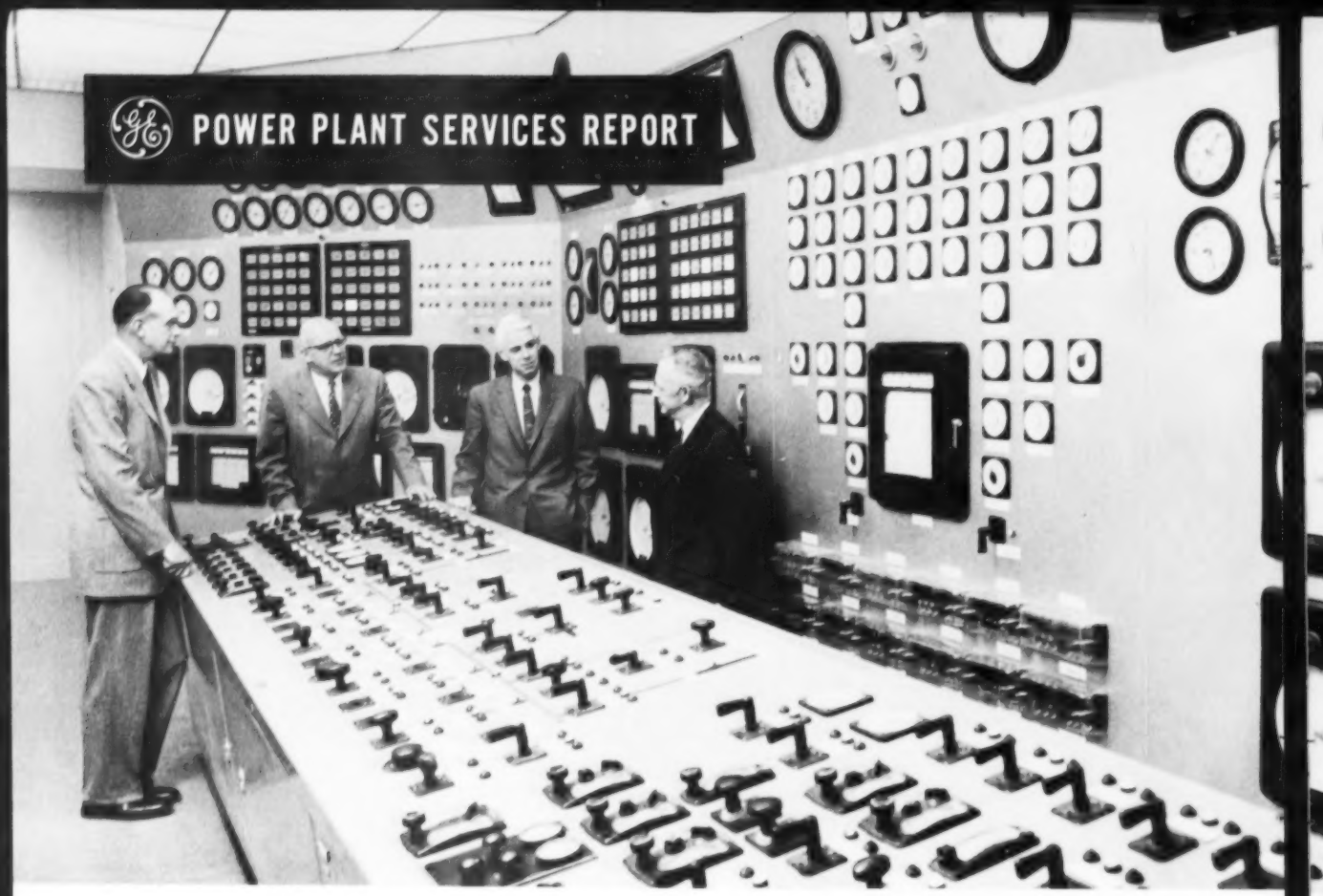
The success of this project was the result of three-way close co-operation between D.P. & L., C.F. Braun, Engineers and Constructors, and General Electric's Power Plant Services Team. The latter contributed invaluable engineering and equipment-planning services which enabled Braun to design and construct the plant on an accelerated basis.

FOR MORE DATA TURN PAGE ▸

MORE POWER TO AMERICA

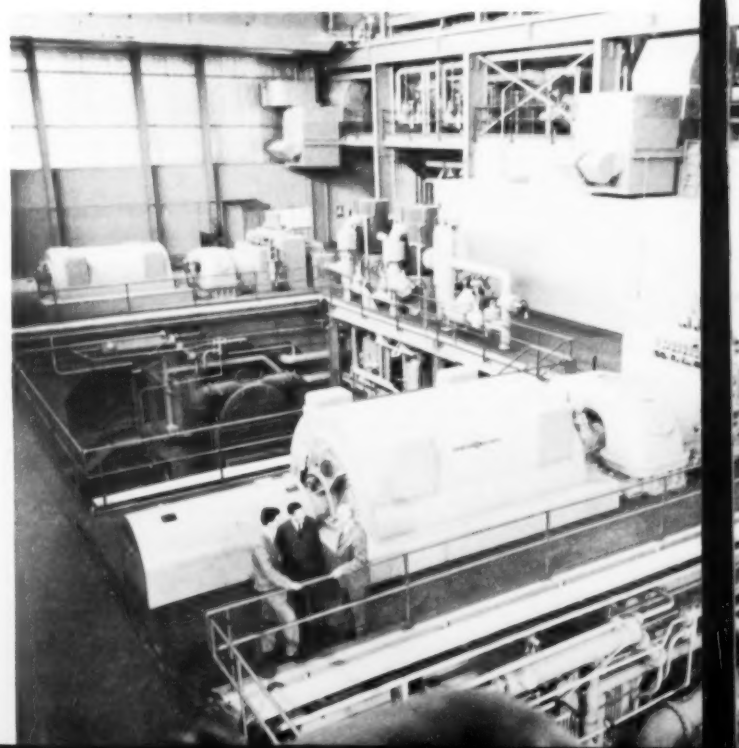
GENERAL ELECTRIC

POWER PLANT SERVICES REPORT

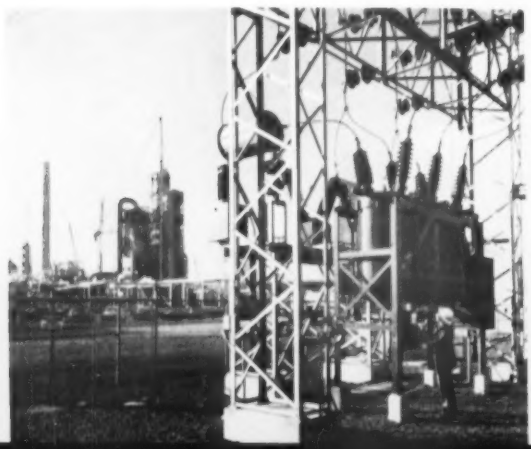


OPERATING EFFICIENCY is boosted by functional grouping of controls and instrumentation on this modern G-E control panel. Readings can be taken rapidly and control adjustments made easily. Grouped around the console (left to right) are C. F. Braun's P. M. Terry, Resident Manager; G. C. Caine, Tidewater's Eastern Division Manufacturing Manager; General Electric Sales Engineer G. A. Eddy; Delaware Power & Light Vice-President F. T. Bear.

EXPEDITED SERVICE got turbines in service fast to operate plant auxiliaries, speed completion of station. These two General Electric 25,000 kw 3600 rpm, hydrogen-cooled units are of extraction type. Turbines are designed to operate at 1,250 psig and 950 F.



FUNCTIONAL LAYOUT of switchyard is feature of new station. Operator DiRusso checks General Electric 2500 mva, 1200 amp. circuit breakers.



Coast-to-coast teamwork co-ordinates building of all-General Electric station for D. P. & L.

Accelerated schedule successful due to close co-operation of D. P. & L., C. F. Braun and General Electric engineering team

The nature of the industrial load created by Tidewater's Delaware Flying A Refinery demands unusual service reliability and flexibility. The recently completed Delaware City Power Station incorporates these features plus facilities for future units, minimum operating manpower requirements and minimum maintenance. The plant is particularly noteworthy for its planned steam flow at 540,000 lb/hr to the refinery and heat rate of 8,700 BTU per kwhr.

However, construction of the 50,000 kw plant posed complex problems in planning. Engineering design and purchasing were done by Braun in California with Braun engineers and General Electric working in close harmony. Orders were placed with various G-E plants throughout the country and equipment was delivered to the job site in the Delaware Valley. Since none of the system components could operate until the generating units were in service, and time was at a premium, General Electric power plant service engineers worked closely on the turbine-generator construction and installation with Braun's co-ordinating, construction, and installation groups, making it possible to get the station on the line on schedule.

This application exemplifies the type of assistance you get from General Electric Power Plant Services when you specify General Electric apparatus. These services consist of product development engineering, application engineering, field service engineering, power plant co-ordination and service engineering which help to:

- **SIMPLIFY ORDERING OF EQUIPMENT**
- **CONSERVE ENGINEERING TIME**
- **INTEGRATE EQUIPMENT DESIGNS**
- **SPEED CONSTRUCTION**
- **ASSIST IN TRAINING OPERATORS**

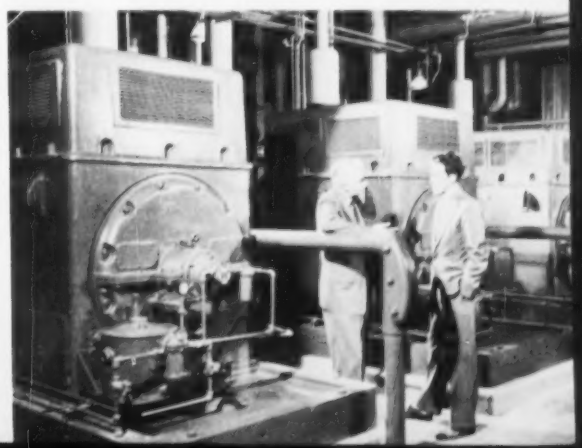
For full information on these Power Plant Services, contact your General Electric Apparatus Sales Office or write for 28-page bulletin GEA-6320 to General Electric Company, Section 302-15, Schenectady 5, N. Y.

FOR MORE DATA TURN PAGE ▸

GENERAL ELECTRIC

FULL PROTECTION is afforded by G-E 2400-v station auxiliary switchgear being examined by C. F. Parcels of D.P. & L. and G.E.'s J. J. Bradley. Switchgear controls plant and boiler feed pump motors.

REDUCED SOUND LEVEL is achieved through acoustic treatment of new 1000 hp, 2300-v G-E boiler feed pump motors. G.E.'s G. A. Eddy discusses motors with Delaware City Station Supt., R. D. Weimer.



KEY TO EFFICIENCY and economies is co-operative planning. Discussing equipment requirements of new Delaware City Power Station at Los Angeles meeting (seated, left to right): C. F. Braun's W. C. Cauthen, Project Manager; C. W. Boice, Chief Electrical Engineer; O. L. Lewis, Chief Project Engineer; and General Electric's Sales Engineer, C. C. Brown. Standing are General Electric's M. M. McGarraugh, Turbine Specialist, and F. M. Dorey, Application Engineer.

General Electric power plant service engineers expedite apparatus selection, installation, start-up

General Electric's power plant service team contributed materially to the successful planning and construction of the Delaware City Power Station in the short period of 18 months. These engineers, working in close liaison with Delaware Power & Light and Braun engineers, were of invaluable assistance in speeding up the design and selection of the best equipment for the job integrating it into station planning, expediting its manufacture and training its operators.

These functions included all of the General Electric Power Plant Services: application engineering, product development engineering, field service engineering, power plant co-ordination and service engineering. Time and money was saved and utility and consultant engineering manpower requirements were minimized.

As the trends in power station equipment continue to higher ratings, improved efficiencies, and even greater reliability, the advantage of selecting General Electric apparatus, combined with the time-saving, money-saving benefits of General Electric engineering teamwork, offers the electric utilities a striking example of why it pays to call in General Electric early when planning a new station.

LIVE BETTER ELECTRICALLY

MORE POWER TO AMERICA

GENERAL ELECTRIC

new

Hubbard Aluminum Alloy Guy Protector

...lighter, stronger!

...lasts years longer!

This new Hubbard Guy Protector has all the features you ordinarily look for:

- quick and easy mounting—multiple attachment holes designed for universal application, at any height, to guy wires, rods and clamps.
- available in either 7 (Al-27) or 8 (Al-28) foot lengths, shipped in pairs.
- balance—equal rigidity and strength throughout.

Now . . . new, aluminum alloy construction brings you these *added* advantages:

- maximum corrosion resistance—even in heavy industrial areas or coastal salt air regions.
- lighter weight—easier stock handling and installation. 50-75% savings in shipping charges.
- better protection—turned lengthwise edges and new heat-treated aluminum alloy give maximum strength, durability.

Cross section view of top clip

Cross section view of bottom attachment

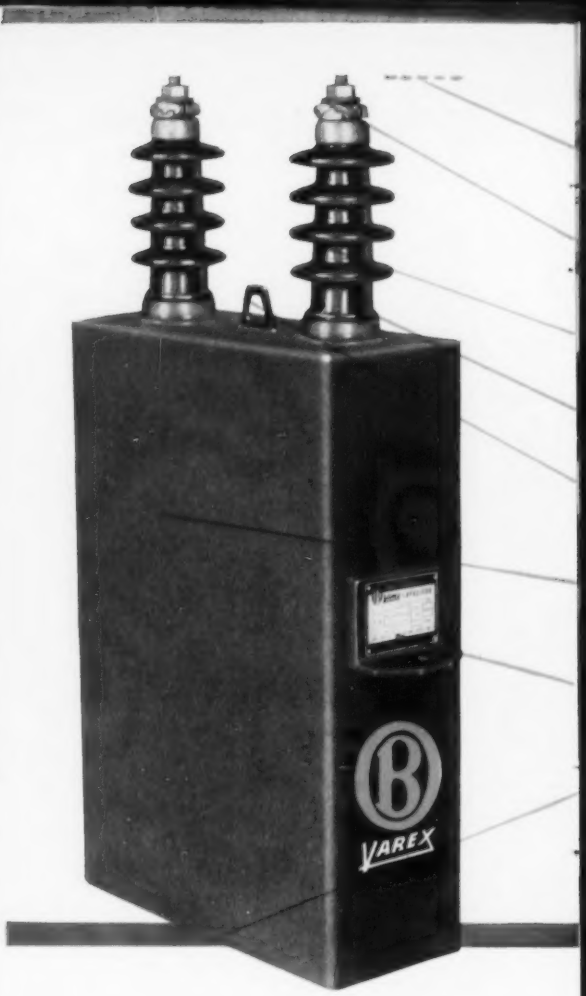
Head of bottom attachment bolt locks in place, will not turn as nut is tightened. Attaches over rod or strand. Attaches to clamp by substituting protector bolt for clamp bolt.

HUBBARD AND COMPANY

Sold exclusively through Electrical Distributors

Pittsburgh 1, Pa.
Chicago, Ill.
Oakland, Calif.
Plano (Dallas), Texas

Here's why you'll like the new VAREX Capacitor



...internal discharge resistors for safety of operator

...highest grade paper dielectric

...low-temperature-type askarel insulating liquid

...annealed aluminum foil

...FOIL COOLING ASSURES EFFICIENT DISSIPATION OF HEAT

...spring pressure holds plates in contact with foil ends . . . no need for buried tabs with their crimped, soldered or welded connections

...horizontal position of elements facilitates cooling, allows elements to be short and structurally sound

ON THE INSIDE

ON THE OUTSIDE

...low silhouette . . . Varex meets all limiting NEMA dimensions, is shorter than most capacitors.

...safety-strip terminals protect stud, bushing and seal.

...long-leakage-distance bushings made of O-B wet process porcelain.

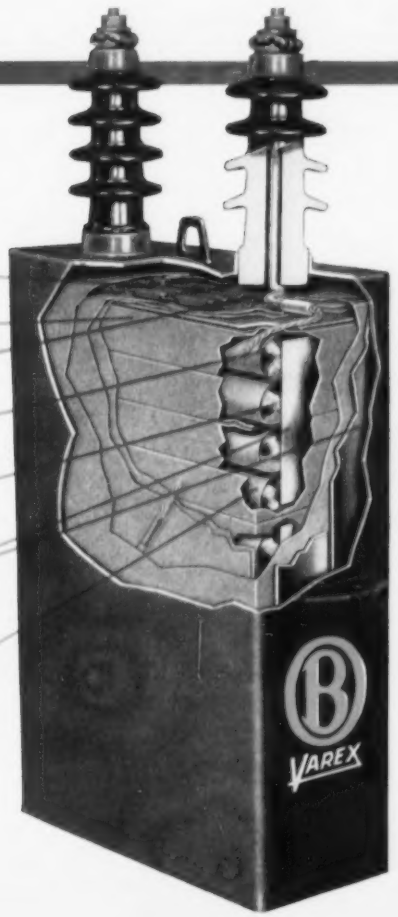
...effective solder-seal fastens bushing to case.

...big, open lifting eye to accommodate wide range of hooks and clevises.

...new epoxy-resin paint has indicated life of several times that of paint normally used on this class of material.

...extra-large nameplate for easy identification.

...recessed bottom to protect against scratching during handling.

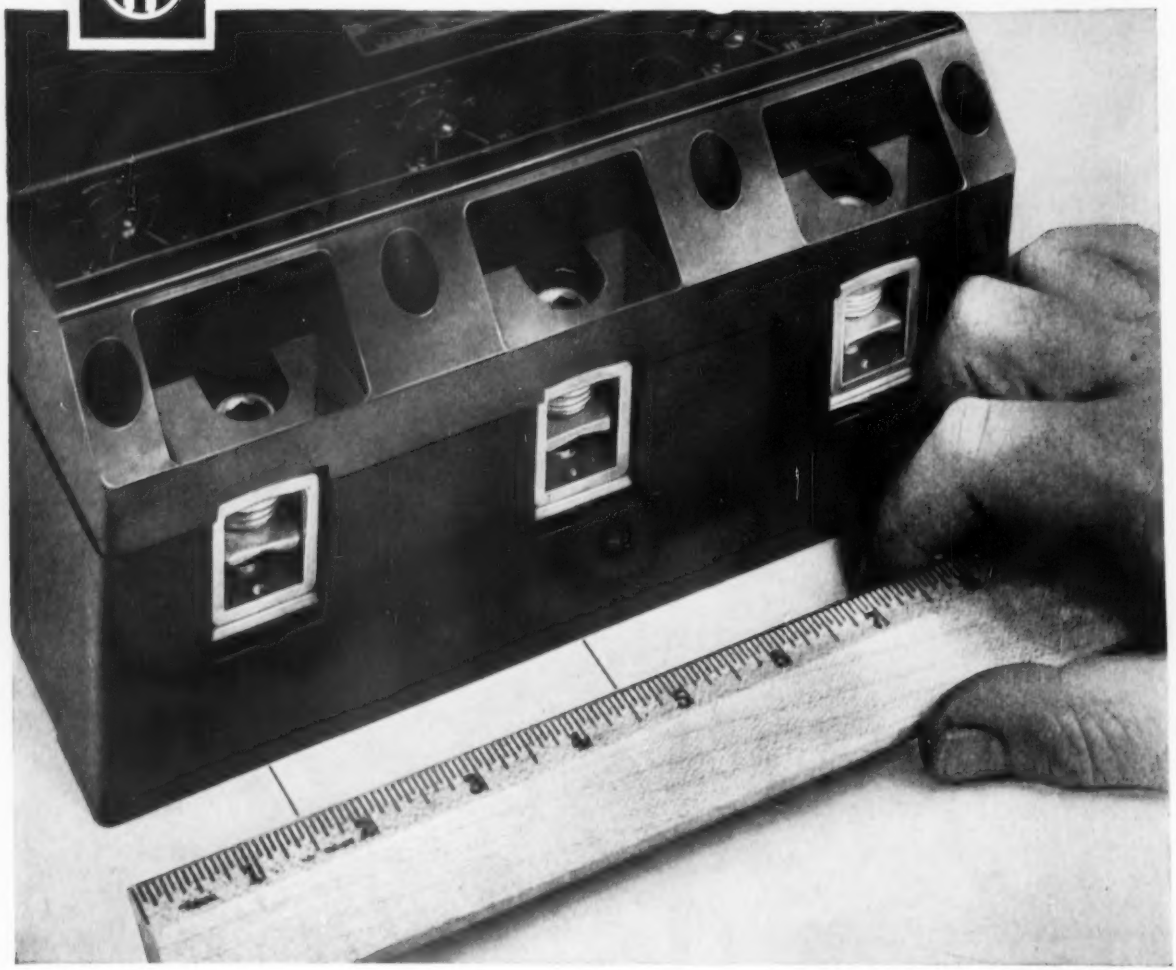


Varex elements are wound in air-conditioned plant to insure quality and uniformity of product.

Ohio Brass

OHIO BRASS COMPANY • MANSFIELD, OHIO

MOLDED CASE CIRCUIT BREAKERS



I-T-E Molded Case Circuit Breakers Have Extra-Wide Pole Spacing

In most circuit breaker applications, the extra-wide pole spacing in I-T-E circuit breakers could be important to you for at least three reasons:

1. Gives added safety
2. Facilitates installation
3. Breaker design permits sturdier construction

Minimum spacing between I-T-E pole centers is $1\frac{1}{2}$ in.—3 in. in all larger breakers. Thus I-T-E molded case circuit breakers give you the maximum in design as well as in performance.

ALL TERMINALS ARE ENCLOSED

An additional design feature of I-T-E molded case circuit breakers is the completely enclosed terminal—no live parts are exposed which can accidentally be touched by the hand.

Wider pole spacing and enclosed terminals are but two built-in advantages which contribute added value to you—at no extra cost. Contact your nearest I-T-E representative for details.

I-T-E CIRCUIT BREAKER COMPANY • **Small Air Circuit Breaker Division**

19th & Hamilton Sts., Philadelphia 30, Pa.

IN CANADA: EASTERN POWER DEVICES, LTD.

What's *New* about this Guy?

The big new facts about Copperweld* Type M Guy Strand are its economy and its convenience.

Copperweld always has cost less per year of service. Now, this low annual cost is still lower, because prices of every size of the new Type M Guy Strand are lower.

Two Copperweld achievements make this possible:

- First, a special new guy strand developed through Copperweld research enables us to meet tensile strength specifications with smaller diameters.
- Second, new guy strand production techniques appreciably reduce the cost of manufacture.

The new Type M Guy Strand is pliable—easy to handle. It can be readily bent, served, moused or clamped. The time-proved Copperweld process, by which the thick copper sheath of each wire is inseparably molten-welded to the steel core, gives full assurance that the copper will not crack, flake or peel.

Type M Guy Strand is available in 7 strengths: 3-wire strand in strengths of 2.2M and 4M; 7-wire strand in strengths of 6M, 8M, 10M, 12.5M and 16M—and sold in coils of 250, 500 and 1,000 feet. Our field engineers will be glad to tell you about the new economies you can realize through its use.

COPPERWELD STEEL COMPANY
WIRE AND CABLE DIVISION *Glassport, Pa.*
For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

New Copperweld

COPPER MOLTEN-WELDED TO STEEL

*Trade Mark

TYPE M GUY STRAND

2.2M 4M 6M 8M 10M 12.5M 16M

"Each and every component good as new ... after four years' continuous service,"

reports Pennsylvania Electric Company

"After four years' service—and more than double the operations of a normal between-inspections period—every component was like new in this Westinghouse URS regulator," states Mr. Frank Bartlett, Jr., maintenance foreman of Pennsylvania Electric Company.

Experiences like this back up 20-year contact-life warranty on URS regulators

"When we opened this Westinghouse URS voltage regulator after four years' continuous service, we found each and every component as good as new," states the maintenance foreman at Pennsylvania Electric's Sayre-Waverly Substation. "Contacts still in perfect operating condition.

"With as many as 100 operations per day," he continues, "this equipment delivered continuous trouble-free service. The Westinghouse URS regulator eliminated the constant adjustments, necessary to prevent drifting, which were required for the regulators we formerly used. Maintenance is extremely low."

He adds, "Complete dependability under constant service, long, trouble-free life, ease of adjustment, and stability in delivering constant voltage make the URS regulator a major factor in guaranteeing customer satisfaction.

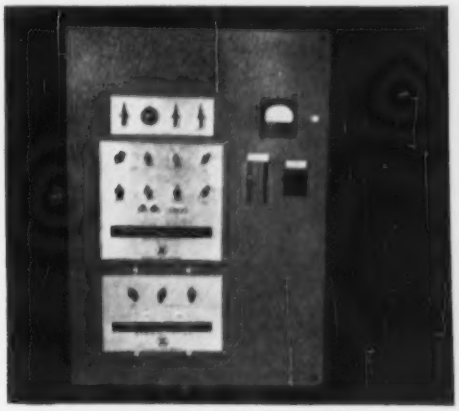
"The 'inside story' revealed when we inspected the unit, gives us complete confidence that this regulator will perform its exacting job . . . for a long time to come."

And now . . . a new concept in precise voltage regulation . . . the URS regulator is equipped with Magamp® (magnetic amplifier) control. Standard for URS and URT load tap-changing equipment for both station step regulators and power transformers. Magamp has no moving parts, no need for mechanical adjustments, no maintenance. All settings—band width, balance voltage, line-drop compensation—are made electrically. This is one of the features assuring still longer life of URS regulators, better voltage regulation.

For all the facts concerning URS voltage regulators, call your Westinghouse representative . . . or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70807

YOU CAN BE SURE... IF IT'S Westinghouse

In this recent announcement, Westinghouse offers a 20-year prorated warranty on contact life for URS regulators with inspection of contacts extended to 10-year intervals.



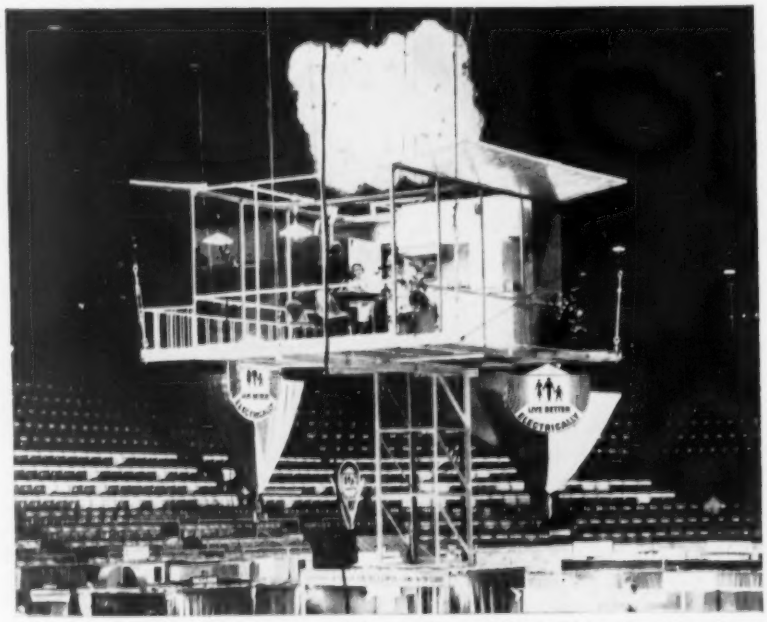
Behind this control panel are the economy of maintenance-free Magamp and the unmatched speed and smoothness of Geneva gear tap changing—exclusive with URS and URT voltage regulators.

LIVE BETTER ELECTRICALLY SPARKS CONSUMER BUYING IN CINCINNATI

Electric Living Exposition launches Spring sales drive

More than 125 manufacturers, dealers and distributors recently took part in Cincinnati's Electric Living Exposition and used Live Better Electrically as their dominant merchandising theme. Co-sponsored by Cincinnati Gas & Electric Co., three local newspapers and The Electrical Association, the Exposition launched the utility's spring sales drive with profitable results for all who participated.

Under the leadership of J. R. Hartman, Vice President of C.G.&E. and E. E. Hodgetts, the utility's director of promotion and advertising, the Exposition was developed as the focal point of a tremendous city-wide drive.



"Home in the Clouds" hung suspended from ceiling at Electric Living Exposition. It was equipped with all the latest in electrical living. More than 3,500 married couples entered contests to live alternately in the "Home in the Clouds," and winners received free electrical appliances.

COMPLETE COVERAGE BY TV, PRESS

Three TV and seven radio stations heralded the Exposition with free publicity and the three major newspapers devoted over 40,000 lines of editorial space to the promotion while generating over 60,000 lines of local advertising. Twenty suburban newspapers also lent their full support to the drive. In addition to heavy advertising and publicity, key department stores featured Live Better Electrically in their window displays, and the entire electrical industry worked together to sell electrical living in every conceivable way.

It was the first time in 17 years that Cincinnati's electrical industry was brought together for such a large-scale promotion.

DISPLAYS SPARK EXTRA SALES

All the exhibitors at the Exposition were enthusiastic about the public's response and pointed out that Live Better Electrically helped create a real shopping mood. The majority of visitors were genuinely interested in buying the products displayed and demonstrated. One dealer put it: "We think the show was very successful, both from the standpoint of contacts and sales we made and the enthusiasm shown by the public." An exhibitor reported "enough sales leads to keep us busy for the next six months," and another added that he "increased store traffic and sales as a direct result of the display." Other typical reactions: "We received excellent exposure per dollar spent". . ."Very happy with the results and exposure of our products". . ."Invaluable consumer exposure". . ."Interest shown in products far exceeds expectations." Exhibitors were so pleased with the results that many of them have requested a repeat performance of the Exposition next year.

Here's how Ed Hodgetts sums up the thinking behind this Live Better Electrically event: "Automobile, homebuilding, fashion and other industries all have their own shows to compete for the consumer dollar. If the electrical industry sits back and does nothing, they'll never get their share." That's why C.G.&E. is so enthusiastic about the outstanding results of all of their Live Better Electrically promotions.

Why not investigate the promotional possibilities of Live Better Electrically in *your* area?

LIVE BETTER
...Electrically

LIVE BETTER ELECTRICALLY

A united effort by everyone in the electrical industry—utilities, manufacturers, dealers, and distributors, builders, contractors—to increase residential load and the sales of electrical merchandise.

Allis-Chalmers unit substations limit today's costs to today's loads

HERE'S an outstanding new installation in the Middle West — a neat, compact, well built Allis-Chalmers substation — with a modern brick wall for good landscaping.

The initial investment for a 10,000-kva unit substation meets today's needs, and it's arranged to add another 10,000 kva with space available clear to the lot line.

And it's easy, with Allis-Chalmers completely factory-built and tested units, to add feeders, or another (or larger) transformer at any time — only space requirements need be preplanned by the utility.

A-5349

Ask for Bulletin 11B7912

For power where you need it, when you need it, for easy, time-saving installation, call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *for progress in switchgear*

To keep pace with greatly increased volume on the West Coast and to maintain our high standards of service, we are proud to announce the opening of a West Coast warehouse in Los Angeles, and the opening of a regional office in Los Angeles. Head of all operations in Los Angeles will be E. William Ross, a leader in West Coast lighting circles for the past 12 years.

GLOBE EXPANDS on the WEST COAST

LOS ANGELES

E. William Ross,
Regional Manager

NEW WEST COAST WAREHOUSE:
1500 S. Santa Fe Avenue, TRinity 4961.
OFFICES: 2121 S. Main Street, RIchmond 9-5436

Take full advantage of Globe's expanded facilities. You'll find it's easier than ever to sell Globe.

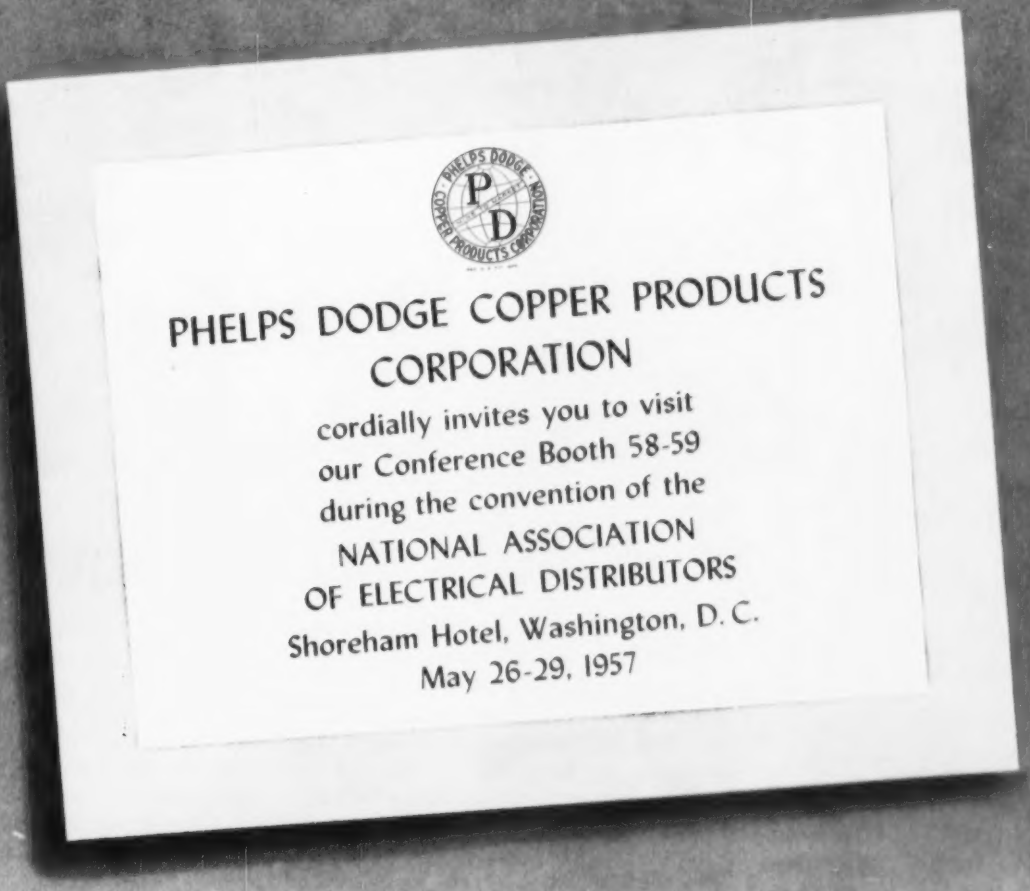
GLOBE

LIGHTING PRODUCTS, INC.

16 East 40th Street, New York 16, MUrrayhill 6-2206

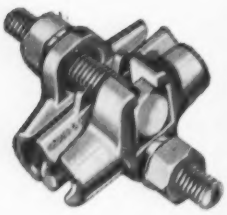
"FOR OVER A THIRD OF A CENTURY, PLANNED LIGHTING FOR BETTER LIVING"

To All Our Distributor Friends...


PHELPS DODGE COPPER PRODUCTS CORPORATION
cordially invites you to visit
our Conference Booth 58-59
during the convention of the
NATIONAL ASSOCIATION
OF ELECTRICAL DISTRIBUTORS
Shoreham Hotel, Washington, D. C.
May 26-29, 1957

PHELPS DODGE COPPER PRODUCTS CORPORATION

300 PARK AVENUE, NEW YORK 22, N. Y.



Conductor Clamps

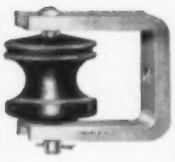
Lamp Lead Brackets

Pole Markers

Underground Racks & Hooks

"Hub-Rak" Secondary Racks

Thimbles



Insulated Clevises

Guy Protector

HUBBARD aluminum hardware cuts corrosion costs

If you are faced with mounting corrosion costs in your service area, it will pay you to investigate Hubbard Aluminum Pole Line Hardware. This constantly growing line of hardware items was especially developed for application in corrosive atmosphere. To accomplish this, Hubbard combined the corrosion resistance, lightness and strength of special Aluminum Alloys with new fabricating techniques to produce hardware capable of long service life under extremely adverse conditions.

The special conditions of contamination in your area as well as other factors can be successfully overcome by the right choice of Pole Line Hardware Material. In addition to Aluminum Alloy, Hubbard Pole Line Hardware items are available in galvanized steel, Cor-Ten steel and special items in Copperweld steel. A Hubbard Hardware specialist will be glad to make a study of the atmospheric conditions which affect the service life of your pole line hardware in order to provide you with the type of hardware best suited to your needs.

GENERAL ELECTRIC SUPPLY COMPANY

A DIVISION OF GENERAL ELECTRIC COMPANY

SAN FRANCISCO • OAKLAND • SACRAMENTO • STOCKTON • FRESNO • LOS ANGELES • SAN BERNARDINO • LONG BEACH • SAN DIEGO
SAN JOSE • PHOENIX • TUCSON • SEATTLE • PORTLAND • MEDFORD • TACOMA • SPOKANE • PASCO • ANCHORAGE, ALASKA

"It's Everybody's Family Tree!"

The familiar utility pole might well be considered "part of the family". Through the years it has supported the wires that bring light, warmth, communication and labor-saving energy into every home.

In countless locations, these wires are being supplanted by SIMPLEX SELF-SUPPORTING AERIAL CABLES, which have built an unmatched reputation for efficiency and dependability. For sixty-seven years, Simplex has pioneered in the design, development and manufacture of all types of aerial cables used for both communication and power distribution. The benefits of this specialized experience are yours for the asking. Write for Catalog 1006, which gives detailed information.

SIMPLEX WIRE & CABLE CO.,
79 Sidney Street, Cambridge 39, Mass.

LIVE BETTER ELECTRICALLY

Simplex

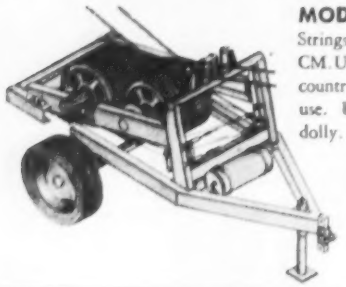
Wire sculpture by Henry Szafarz

Anhydrex Insulated, Neoprene Jacketed, Self-Supporting Aerial Cable

Partial showing of the now ***COMPLETE*** line of . . .

PENGO TENSION WIRE STRINGING EQUIPMENT

Manufactured by PETERSEN ENGINEERING CO., Santa Clara, Calif. • 14 Patents Pending!

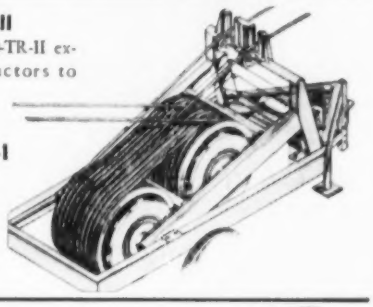


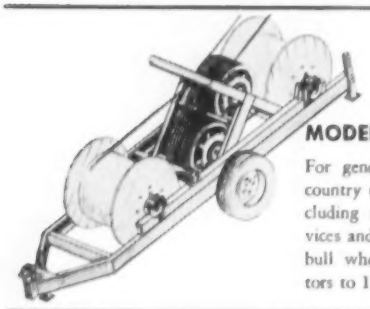
MODEL 5000-TR-II
Strings two conductors to 556,300 CM. Used primarily for very rough country work; also for general use. Use separate reel-carrying dolly.

MODEL 5000-TR-I
Similar except strings one conductor.

MODEL 6000-TR-II
Similar to Model 5000-TR-II except larger. Conductors to 1,272,000 CM.

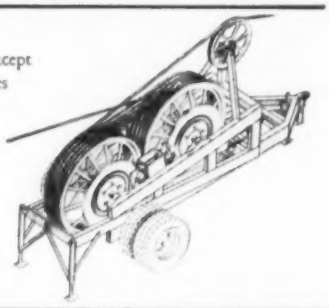
MODEL 6000-TR-I
Similar except for one conductor.

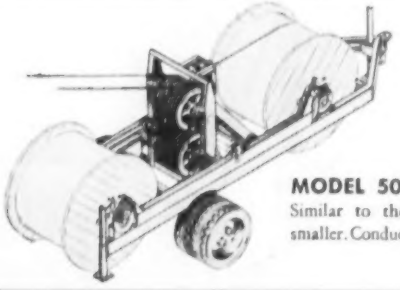




MODEL 6000-WS-TR
For general and medium rough country use. A complete unit including trailer, reel-carrying devices and its own double pair of bull wheels. Conductors to 1,272,000 CM.

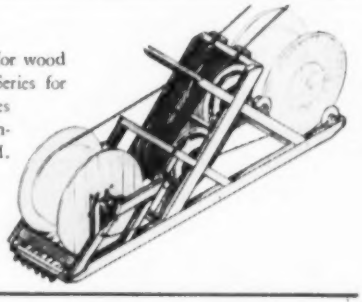
MODEL 7000-TR-I
Similar to model 6000-TR-I except larger. Conductors to 2 inches diameter.

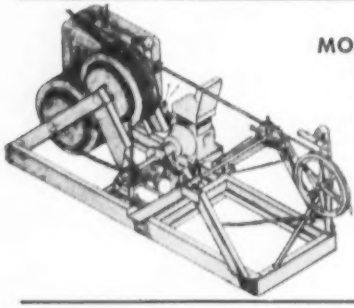




MODEL 5000-WS-TR
Similar to the 6000-WS-TR but smaller. Conductors to 556,300 CM.

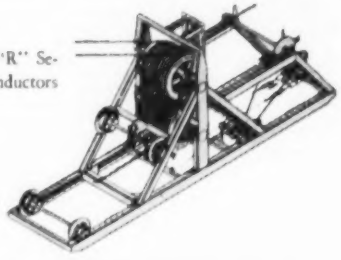
MODEL 6000-W
Available in "S" Series for wood or steel reels, in "R" Series for steel reels, or "SR" Series for trailer mounting. Conductors to 1,272,000 CM.

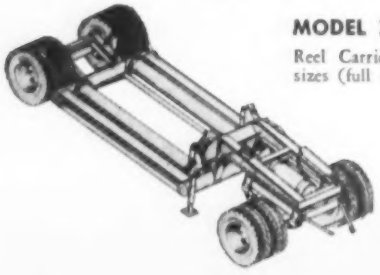




MODEL 6500
Bull Wheel Cable Puller. Available in "R" Series for steel reels, "S" Series for wood reels. Conductors to 1,272,000 CM. Also available in "LWR" Model for extra-large steel reels. Model 5500 similar (smaller).

MODEL 5000-SR
Available in "S" Series, "R" Series, or "SR" Series. Conductors to 556,300 CM





MODEL 7500
Reel Carrier. Takes the largest sizes (full range) of steel reels. Loads and unloads with one man. No auxiliary equipment needed except the truck that pulls it. For use with any one of the tensioning machines shown on this page.

ADDITIONAL MODELS NOT SHOWN

Tension Reel Trailers

MODELS 2, 3, and 4, Two-Wheel Straddle Dollies not shown. For use with any one of the tensioning machines shown on these pages.

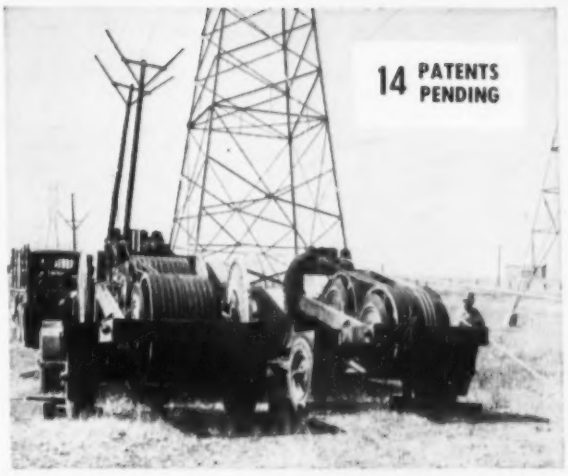
Tension Stringers

MODELS 6000-SK-I and 6000-SK-II For one or two conductors to 1,272,000 CM. Skid mounted for installation on owner's equipment.

MODELS 5000-SK-I and 5000-SK-II Skid mounted for installing on owner's equipment. For stringing one or two conductors to 556,300 CM.

MODEL 5000-WS-III Strings three conductors to 556,300 CM. For mounting on low-bed or full trailer.

MODEL 6000-WS-III Strings three conductors to 1,272,000 CM. For mounting on low-bed or full trailer.



Two PENGO model 6000 TR II wire tensioners being used by Pacific Gas and Electric Co. in reconductoring job between Vacaville, Calif. and Cottonwood, Calif. 285 miles of 500 MCM copper is being replaced by 954 MCM aluminum in this operation.

Newest method of stringing overhead lines

Two PENGO model 6500 Bullwheel Cable Pullers used by Pacific Gas and Electric Co. for pulling in the new line on the job mentioned above. Unit, manned by an operator and one reel tender, pulls the pulling line (in this instance the old copper conductor) over the double neoprene lined Bullwheels and winds it for shipment in a single operation.

- **Safest, most economical way of stringing transmission, distribution and even secondary lines.**
- **Its greatest savings are effected when stringing over and through energized circuits . . . by far the safest, too!**
- **14 Patents pending!**

Smooth, postive control of conductor tension can be maintained at all times regardless of model or size of PENGO tensioning equipment used. The large, specially designed PENGO disc brakes are mounted away from the Bullwheels to assure dissipation of the heat generated by the continuous braking action and prevent transmission of the heat to the Bullwheels.

Note the wide range of models on the opposite page available for all types of jobs or terrain and for all sizes of conductor.

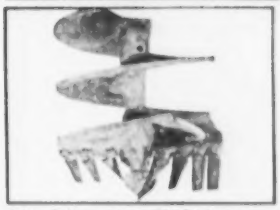
List your requirements and send for descriptive literature and prices.

Made by the makers of the World-Famous
PENGO EARTH AUGERS

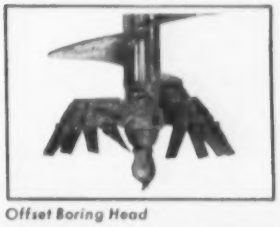
PETERSEN
ENGINEERING COMPANY
Santa Clara, Calif.

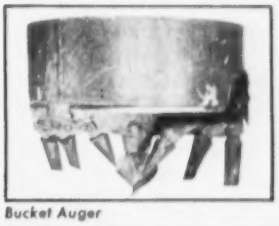
PETERSEN ENGINEERING CO.
Santa Clara, California Dept. 3
Please send me more information on the new Pengo wire stringing equipment.
Name_____
Firm_____
Address_____
City_____ State_____

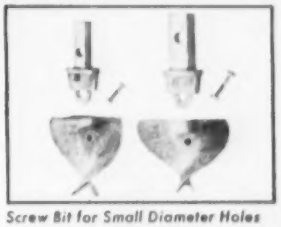
Other PENGO Products include:


24 inch Heavy Duty Flight Auger

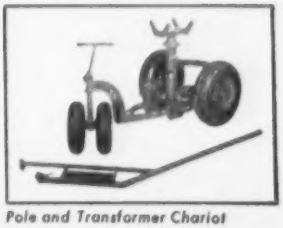
Double-Helix Heavy Duty Auger


Offset Boring Head


Bucket Auger


Screw Bit for Small Diameter Holes

Pulling Eye


Pole and Transformer Chariot

"We like the convenient storage characteristics of POC Bushings ---no special procedure or special handling is required."

"These totally-enclosed oil-filled bushings for lower voltages will surely create a trend."

"We gave it more severe tests than any other bushing we ever tested --- and we approve it without modification or alteration."

"THE CADILLAC OF BUSHINGS!"

"Excellent Design."

"AN EXCELLENT DESIGN, AND MANUFACTURED IN THE BEST OF FACILITIES."

"An ideal design, and well-suited to applications where existing bushings cannot be used."

"A superior bushing, but we'd expect nothing less from Lapp."

"Seems to be an excellent bushing; we can find no faults whatever."

APPROVED and ACCEPTED

Lapp POC* BUSHING

*PAPER-OIL CONDENSER TYPE
TOTALLY-ENCLOSED CORE
ASA STANDARD

In its first six months after announcement, the Lapp POC* Bushing has won the enthusiastic endorsement of utility engineers and equipment manufacturers from coast to coast. Rigorous characteristic and performance tests have been conducted in customer laboratories or in the Lapp laboratory under customer supervision. Practically every utility and every equipment manufacturer who have seen this bushing have placed it on Approved or Standards Lists—or tell us they are in process of approving it.

Lapp POC* is the bushing design of the future —ready to serve you reliably today.

Lapp Insulator Co., Inc., Le Roy, N. Y.

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A MESSAGE TO AMERICAN INDUSTRY • ONE OF A SERIES

A Progress Report on Faculty Salaries:

UP . . . But Not Nearly Enough

THE CHART on this page provides a report of the progress being made in solving a problem of crucial importance to every American. The problem is that of seeing that college and university faculty members get decent salaries.

This new chapter, which brings the story forward two years—from 1954, when it was last dealt with in this series of editorials, through 1956—has a decidedly cheering element. For in the last two years faculty salaries have made real headway.

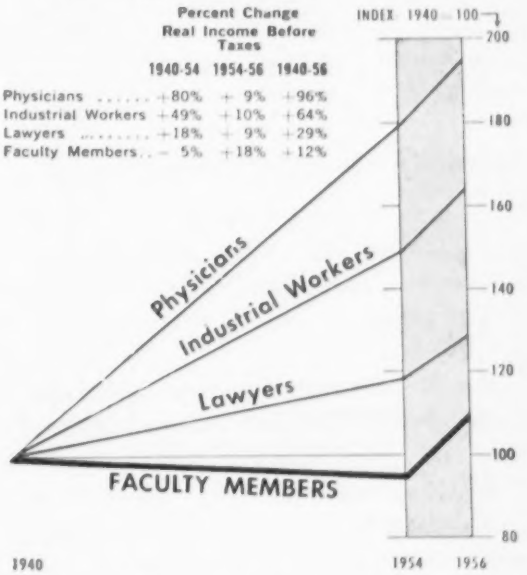
Two Years of Improvement

In 1954, in terms of what their salaries would buy, faculty members as a whole were actually worse off, by 5%, than they had been fourteen years earlier. As the chart shows, over the same period the real income of the average industrial worker had increased by almost half. And, in what it would buy, the income of the average physician, with professional training comparable to that of the average faculty member, had jumped by 80%.

In 1956, however, the average faculty salary would buy about 12% more of goods and services than it would in 1940. Relative to where they were two years before, faculty salaries showed a larger gain over the two years than those of any of the other groups whose salary progress is charted.

This movement of faculty salaries in the right direction has many contributing causes. The biggest single boost was given by the great Ford Foundation gift of half a billion dollars to our colleges, universities, and hospitals, almost half of which was ear-marked for faculty salary increases. Gifts from business firms have also

What is Happening to College Faculty Salaries



DATA: Council for Financial Aid to Education, U. S. Dept. of Commerce, U. S. Dept. of Labor, National Association of Education Research Dept., McGraw-Hill Dept. of Economics.

helped a lot. And so, in many cases, have stepped-up money-raising campaigns by alumni groups and cooperative regional and state groups of colleges.

Still a Long Way to Go

However, faculty salaries started their ascent from such a dismal depth that they still have a long, long way to go up before there is room for the comfortable conviction that they are fair, or even safe, from the standpoint of protecting the nation's vital interests. It still remains possible to find many shocking companion pieces for the following incident recently reported to a McGraw-Hill executive group, working on problems of financial aid to higher education, by the president of an illustrious small liberal arts college.

"The recruiting officer of one of our large industrial companies came to our campus a few weeks ago," the college president said, "and offered five of our seniors higher salaries to start working for that company when they are graduated next June than the salary received by any member of our faculty. And the seniors, of course, promptly went to their professors to seek advice on whether or not they should accept. It doesn't take much imagination to see what this sort of thing does to the morale of a faculty."

Senior Teachers Fare Badly

One of the more devastating things it does, of course, is to make the more experienced college and university faculty members receptive to the idea of going to greener pastures, currency-wise, in business and industry.

For these senior faculty members the financial pounding in the past 16 years has been even worse than the chart indicates. While the average real salary gain reported by the chart has been 12%, the average salary of a full professor still buys less than it did in 1940. This is because most of the salary increases have gone to beginning instructors, for whose services industry has been providing the sort of competition reported by the liberal arts college president.

And it creates this financial lackluster of posts as senior college faculty members right at the time their services are needed more than ever to handle the oncoming flood of college and university students. Between now and 1970 college and university enrollment is expected to double.

What is Needed Now

What is clearly needed is a continuation and intensification of the drive to increase their salaries to a point where college and university faculty members will be sharing somewhere near fully in the general prosperity of the nation. It could be counted good progress in this direction if over the next two years faculty salaries on the average were to go up another 12%, with most of the increase concentrated in the senior faculty ranks. And this can be made possible only through more outside contributions.

There is reason to be encouraged by the progress that has been made over the past two years in bailing college and university faculty members out of the terrible financial hole into which they were allowed to slide. But there is the most urgent occasion to keep at it and harder.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

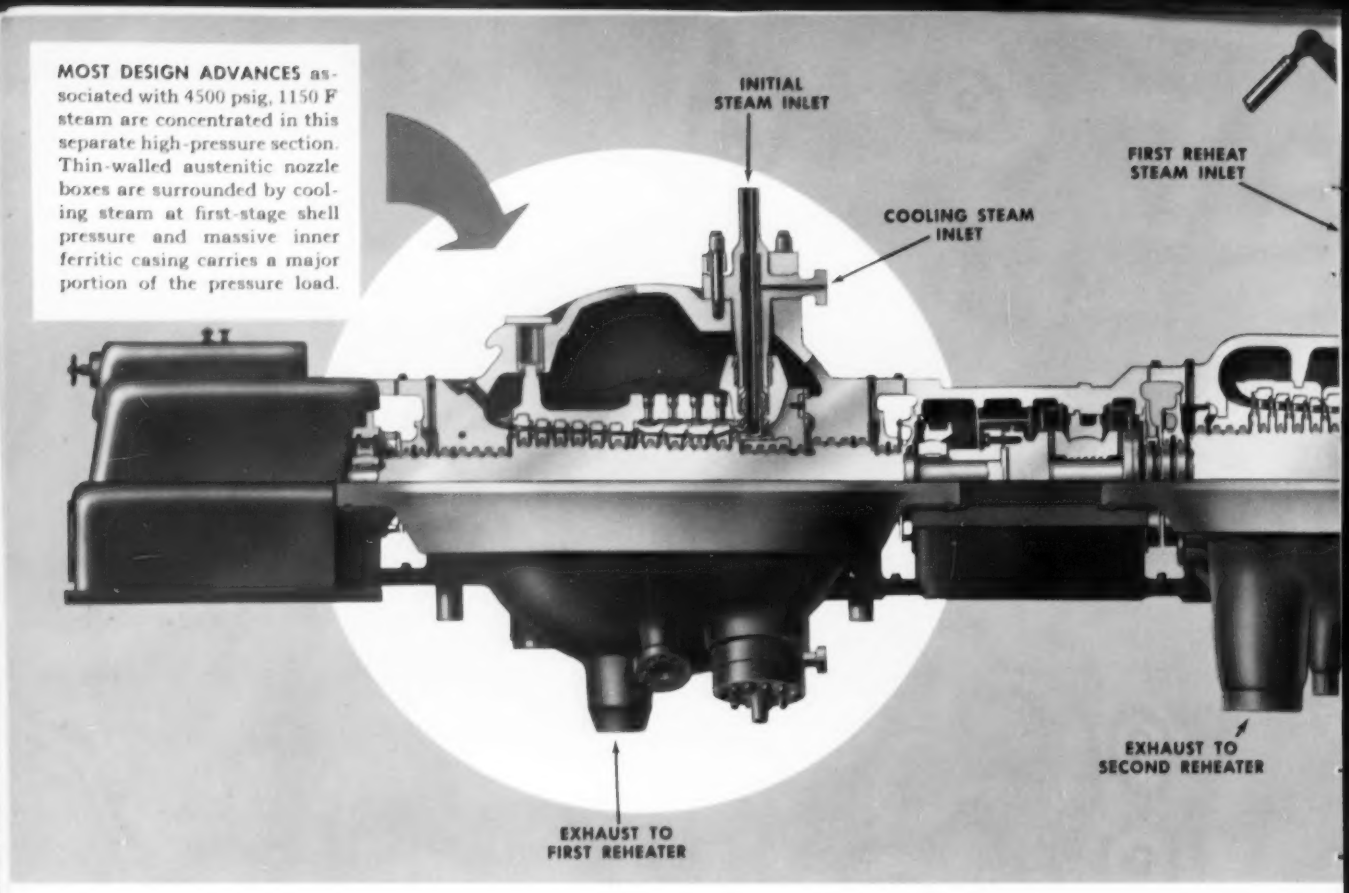
World's First Supercritical Double-Reheat Steam Turbine Installed at Philo Plant

New 125,000-kw General Electric unit at Philo Plant of Ohio Power Company marks another milestone of progress in the development of more economical electric power production through higher initial steam conditions.

Progress Is Our Most Important Product

GENERAL ELECTRIC

FOR DETAILS, TURN TO NEXT THREE PAGES


MOST DESIGN ADVANCES associated with 4500 psig, 1150 F steam are concentrated in this separate high-pressure section. Thin-walled austenitic nozzle boxes are surrounded by cooling steam at first-stage shell pressure and massive inner ferritic casing carries a major portion of the pressure load.
INITIAL STEAM INLET
FIRST REHEAT STEAM INLET
COOLING STEAM INLET
EXHAUST TO SECOND REHEATER
EXHAUST TO FIRST REHEATER

Higher pressures and temperatures operate through double-reheat cycle to raise fuel economy

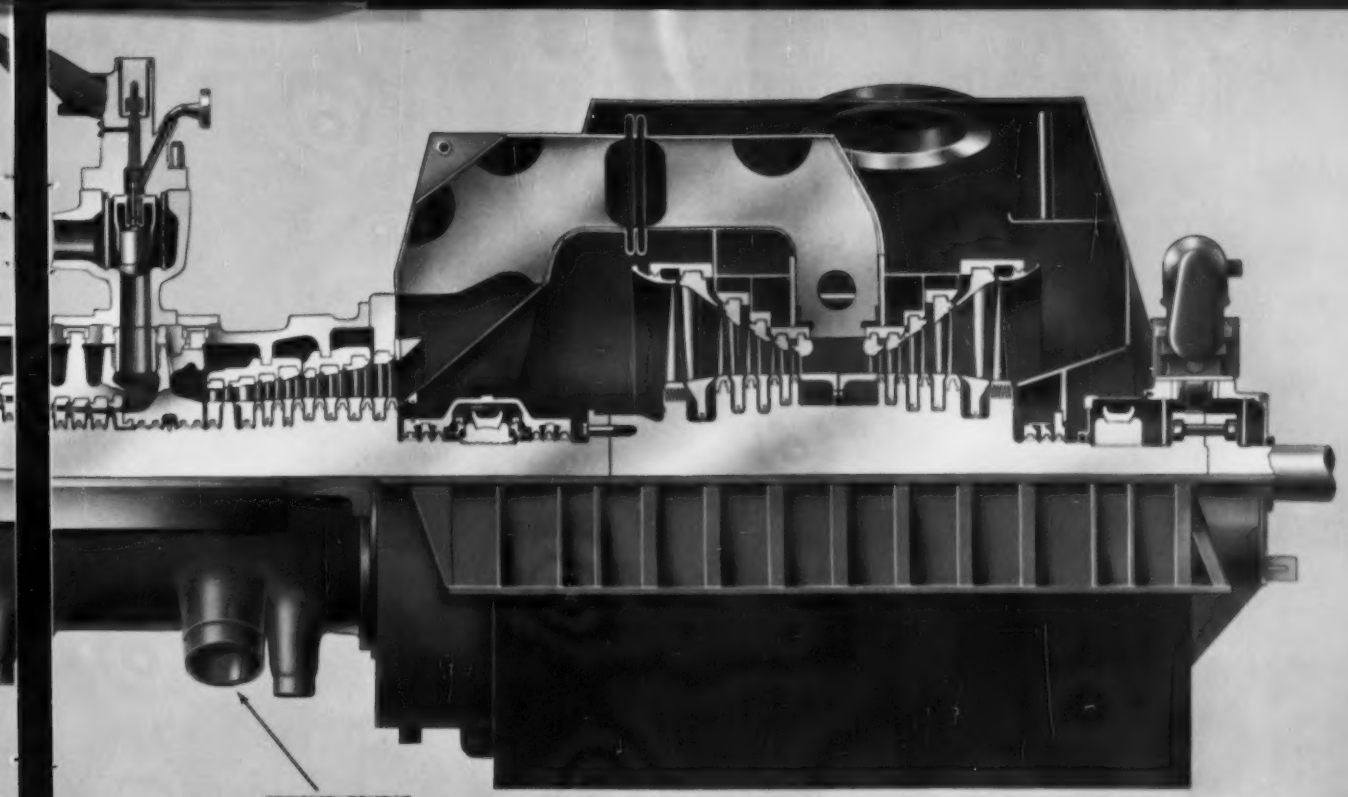
New unit will run at 4500 psig, 1150 F initial temperature, with 1050 F first reheat and 1000 F second reheat

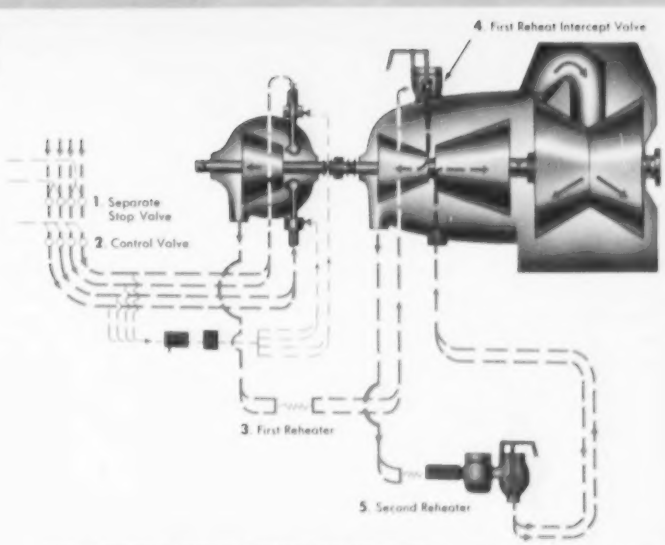
The Ohio Power Company's Philo Plant, one of the key generating units of the American Gas & Electric Company's system, has become the site of another significant advance in electric power generation. It will be the first station to generate commercial electric power from a turbine-generator operating at the supercritical pressure of 4500 psig—almost double the highest pressure used to date. Its initial steam temperature of 1150 F is 50° greater than the previous high of 1100 F reached only three years ago.

These advanced steam conditions, coupled with the first application of the double reheat cycle, can increase thermal efficiency 5% over the most efficient steam plant now in operation.

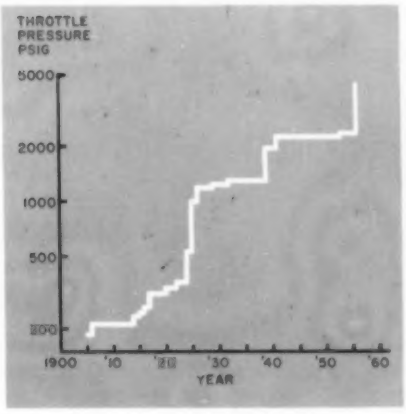
ONE OF THE MAJOR PROBLEMS General Electric designers had to overcome was the danger of thermal distortion of thick austenitic castings and forgings. So austenitic steel parts were made as thin as possible by use of 1) a steam cooling arrangement which permits the use of thin-walled austenitic sections with low temperature gradients and reduced susceptibility to distortion, 2) individual control valve bodies of small diameter and consequently thinner walls, 3) multiple steam pipes with individual turbine stop valves placed in each line, and 4) simple throttling control with full 360-degree arc admission to the first stage nozzles.

THE EXPERIENCE GAINED and new ideas developed during the design and manufacture of this first supercritical pressure steam turbine are already being applied to the study of larger units for even more economical operation. The Philo turbine may well mark a turning point in the history of steam power generation. For more details, write for Bulletin GER-1130, Large Steam Turbine-Generator Department, General Electric Co., Schenectady 5, New York.





Progress in increasing throttle steam pressure over the past 50 years. The new advance to 4500 psig represents the first major step upwards since a maximum of 2300 psig was achieved in the early 1940's.

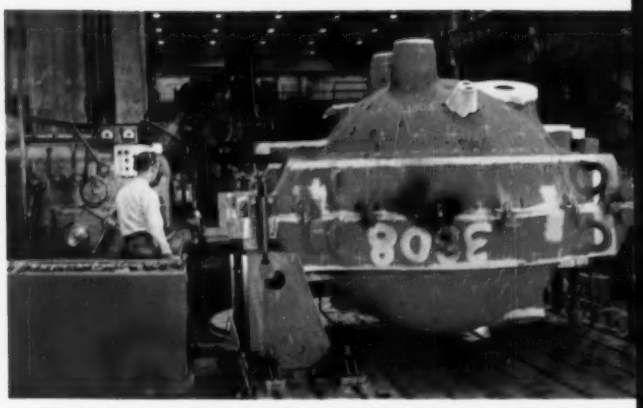


SUPERCRITICAL STEAM ENTERS THE TURBINE through four main steam pipes. Each pipe has a separate stop valve (**1**) and control valve (**2**) located below the turbine room floor. Steam exhausts at 800 F to first reheater (**3**). Here it is reheated to 1050 F and enters center of intermediate turbine through first intercept reheat valve (**4**). Then it expands through nine stages toward middle standard and exhausts to second reheater (**5**) at approximately 207 psig, 600 F. Steam leaves reheater at 1000 F to re-enter remaining portion of intermediate section, passes through crossover, and expands to condenser through double-flow, low pressure turbine.

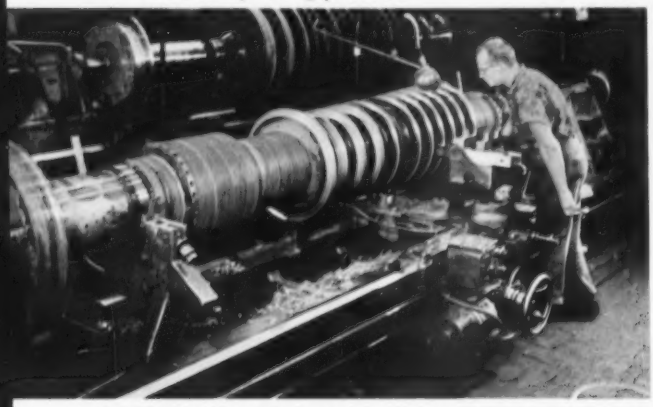
GENERAL ELECTRIC

Building a 4500 psig supercritical steam turbine...

1 **CASTING COMES IN:** Lower half of massive cast ferritic outer casing for high-pressure section is delivered. Spherical shape helps minimize stress and enables casing to withstand operating pressures.

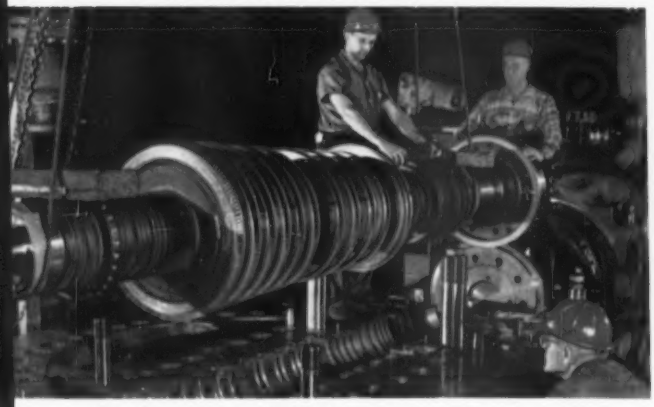


2 **MACHINING OF CASTING** is done with extreme accuracy. Prior to machining, casting was thoroughly checked for internal flaws by 15-million-volt betatron, which can "see" through more than a foot of steel.

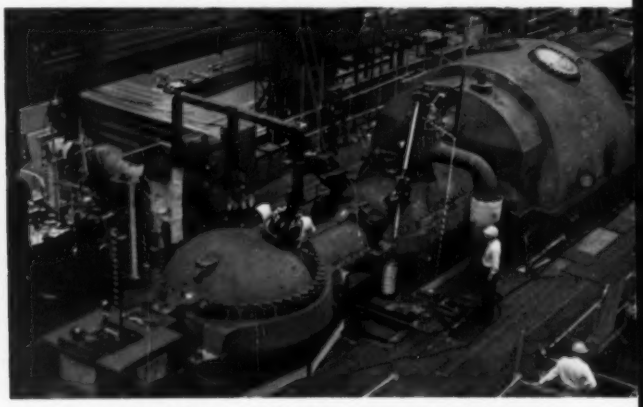


3 **ROTOR IS MACHINED** from a solid forging of Type 347 steel, then heat treated to remove stresses. An alternate steam-cooled ferritic rotor is also being supplied for further developmental studies.

4 **ROTOR IS INSPECTED** after final assembly. First stage buckets are only about 3/8 in. long, with multiple-hook dovetails designed to take care of differences in thermal expansion between rotor and buckets.



5 **TURBINE IS ASSEMBLED** as high-pressure rotor is lowered into lower half of shell. High temperatures and pressures necessitated several unique innovations in design of diaphragms and other parts.



6 **FINAL ASSEMBLY** is culmination of months of designing, manufacture and exhaustive testing of individual components. Operating at 4500 psig, this unit will help evaluate the use of supercritical steam.

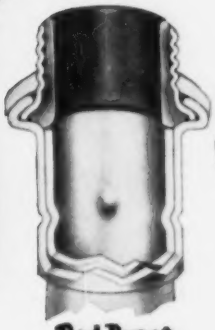
Leader in Turbine-Generator Progress

GENERAL ELECTRIC

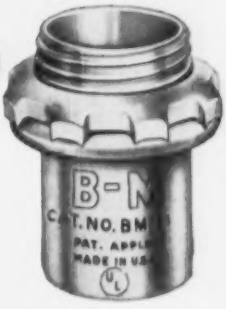
B-M

the original concrete-tight **INDENTER FITTINGS** *for E.M.T.*

Red Throat
Insulated Connector



Red Throat
Cross section



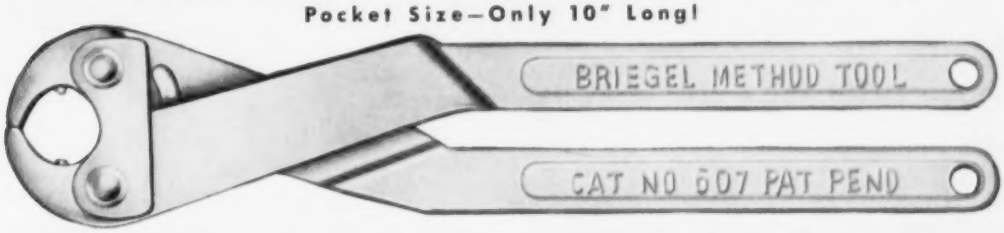
"BM" #100
Cutter for ½, ¾ and 1" E.M.T.

"BM" #1000
Holder for ½, ¾ and 1" E.M.T.

"BM" #600
Changeable Jaw Indenter

THE NEW BM607 INDENTER FOR ½" FITTINGS

Pocket Size—Only 10" Long!



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ELECTRA'S HUSBAND

Our good friend, the college recruiter who spent the last five months searching out new engineering talent, stopped in for dinner on his way back to headquarters. Naturally the table conversation was dominated by the pros and cons of the manpower situation.

"I've never had it so tough," sighed our guest as he reached for a postprandial cigarette. "Some of my competitors even tried to recruit me."

"That I would have liked to see," giggled Electra. "Sheepskin hunting must be getting just about like deer hunting where there are more hunters than there is game."

"As far as the graduating engineers are concerned," said the traveler, "it's hard to sign them up in the first place and it's getting just about as hard to keep them after they have been with the company two or three years. The new crop this year is a mighty savvy lot of young fellows who know pretty well what they are looking for when they take off the cap and gown."

"Yes," I replied, "this business of recruiting is getting to be a science all its own. I don't know whether you've seen the figures or not, but McGraw-Hill just made a survey of over 2,500 recently hired engineers. Actually the project was undertaken to help advertisers and personnel people determine just what the most effective appeals would be in 'help wanted' ads."

"I haven't seen the report yet," replied our friend, "but I certainly would be interested in some of those data.

"In a nutshell, 'opportunity' came out as the single most important motivating force. However, salary and security ran close seconds with a company's prestige, reputation and research program also in the money. Strangely enough employee benefits, such as profit sharing, recreational facilities and most of the other fringe inducements that we sometimes think are very important, rated very low as decision-making factors."

Electra chimed in, "How do you think the electric utilities fared in this year's head hunting?"

"To be truthful," replied our friend, "I don't think that they did very well. But that's not the worst part of it, the 60-cycle curriculum in most of the schools is getting less and less attention. You can see it shrink year by year. The faculty members say there's just not enough interest in the power courses and there seems to me to be quite a trend in thinking in academic circles toward building courses with less specialization right across the board."

Wanted: Glamour

"In case you haven't seen it," he continued, "there is another very interesting survey which was prepared for Eta Kappa Nu, the electrical engineering honorary fraternity, by the Stanford Research Institute. There's a copy of it in my briefcase in case you would like to see some figures that I think are rather alarming."

"I certainly would," I replied. "Why don't you get it and we'll adjourn to the living room for more coffee?"

When we had all settled down our guest opened up a booklet and began by saying: "This particular study was made to establish the desires and intentions of electrical engineering students who are about to enter the labor market. It covers 14 major fields of employment in which electrical engineers are dominant. Basically the students were asked for their opinions, both on the technical opportunities in these various fields and on the financial opportunities. It represents nearly 3,500 senior and graduate students in practically every major technical college and university in the country. Now look at this chart."

As we poured over the findings one thing was apparent. Only 5% of these students felt that the financial opportunities in electric utility operations were good and 48% thought they were poor. Insofar as the technical opportunities were concerned, 12% rated the electric utility industry as good but 47% thought they were poor.

"This is something to think about," said our friend. "Students rate government employment and electric power utility employment equal insofar as financial opportunity is concerned. Even though they rate teaching as a poor financial opportunity, more than eight times as many rate it as a good area for technical and professional development. The real significant thing, though, in looking at these charts, is the high opinion held by students of the electronic and the electrical manufacturing industries as places where they can get both technical opportunity and financial reward.

"It's not a pretty picture," I commented, "and it's really the first time that I've seen some definite figures that pertain strictly to electrical engineers. Why, if the industry is only going to get 5% of the total engineering graduates each year, it won't have enough to cover the normal retirement rate, let alone provide any reserve for the future growth that we know we're going to get."

Electra had been listening to all this with an enigmatic smile on her face. I could feel that the harpoon was on its way.

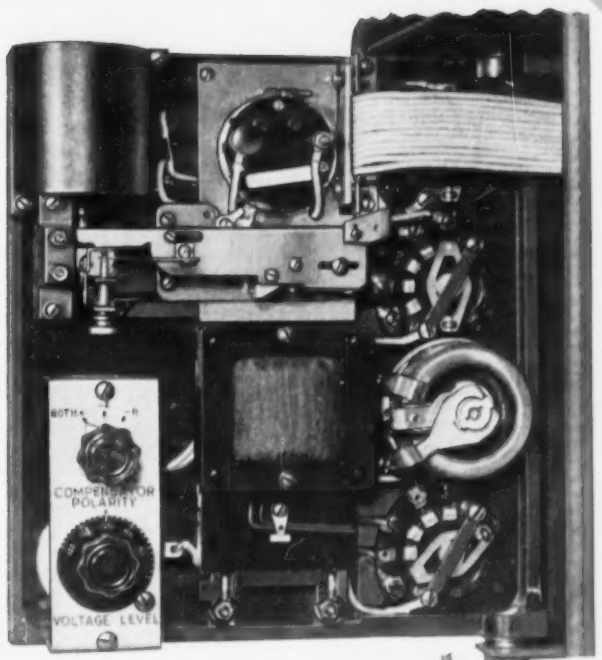
"I think you men are just a little bit silly," she exclaimed. "You are always overlooking the obvious. All of us know that there are plenty of exciting challenges in building and operating power systems. You've just been so absorbed in getting the job done that you haven't sold these young people on what you can offer them."

"That's all very easy to say, Electra," I retorted, "but how do you go about doing it?"

"If you will pardon the introduction of a feminine viewpoint," said Electra, "it's the difference between trying to sell a mink stole by hanging it on a rack or putting it on a beautiful model. All you have to do is to figure out some way of putting some glamour into what the industry is doing and parading it in front of some of these young fellows." She looked directly at me. "You are supposed to be a genius, by your own admission, of course. Figure out some way to glamorize what your young engineers are doing right now and you won't have to be worried about being content with any 5% of the future graduates."

continued improvements in 3-phase regulators

CONTROL



Basic design — long-proved for service and simplicity—remains the same. Recent improvements like these have been added:

- Motor switches are electrically interlocked so that only the raise or lower circuit can be closed at a time.
- All screws, bolts, panel inserts and metal parts are nickel-plated for longer life.
- Stabilizing coil incorporated into solenoid of voltage-regulating relay.
- Rustproof plastic coating on open edges of control cabinet.
- Handy control diagram on inside cover.

These are only a few of the many new features of Allis-Chalmers 3-phase regulators. For further details contact your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

ALLIS-CHALMERS

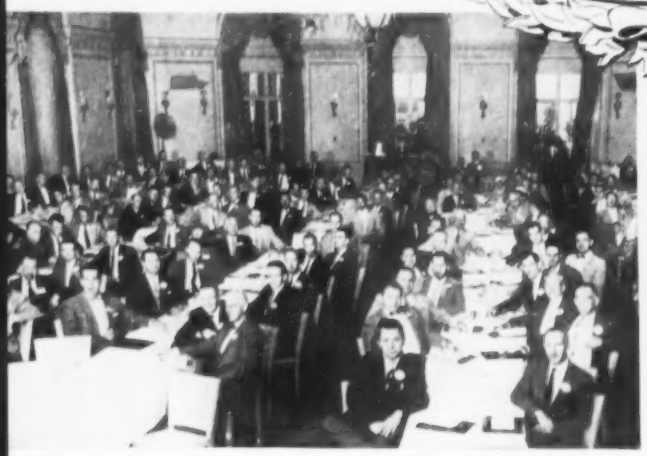
A-5408

A staff of consultants performs a variety of practical services for W.E.P. Co. customers. This service even includes cooking specialists who design industrial cafeterias and suggest equipment.

Automation forum and other such activities that I.P.&L. consistently sponsors and promotes, assist their sales and engineering staff, alerting them to new developments and selling possibilities.

Good public relations is fostered by Wisconsin Electric Power Co. through tours of power stations. Industrial customers and the public are impressed by service provided by giant generating plants.

Training courses are one of Indianapolis Power & Light's many positive steps to increase efficiency of sales and engineering staff. Example: this course in Metal Sheath Electric Heating.



Wisconsin, Indiana utilities win 1956 More Power to America awards

Indianapolis Power & Light Company and Wisconsin Electric Power Company stress more personal contact, improved customer relations and service

The 1956 winners of the More Power to America Awards, as announced by Edison Electric Institute, effectively illustrate that fulfillment of industrial load growth forecasts is best accomplished by positive action.

In line with the MPA Award requirements, both these utilities made excellent use of industrial forums, training courses, and timely promotions, evidencing at the same time a keen interest in industrial and community affairs. In addition, they provided consulting services for their customers and contacted them regularly.

One of the greatest advantages to any utility, inherent in competing for the award, is the incentive for making a broad appraisal of achievements and potential, with an eye toward even greater improvements and efficiency in the future. Why not document your activities and plan to compete for an MPA Award in 1957? For full details contact the Edison Electric Institute or General Electric Company, the donor of the award. General Electric Company, Section 301-355, Schenectady 5, N.Y.

LIVE BETTER ELECTRICALLY

MORE POWER TO AMERICA

GENERAL ELECTRIC

ELECTRICAL WEST
SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U.S.
VOL. 116, NO. 5 MAY 1962

Dotted line shows site of Yuma-Axis plant. Colorado River and Imperial District's Pilot Knob hydro plant are in background

Pooled Demands Promote Savings

Partnership philosophy applied to a thermal addition yields economies for three power systems serving the Pacific Southwest areas; results in one large modern power station, and unusual split-ownership agreement.

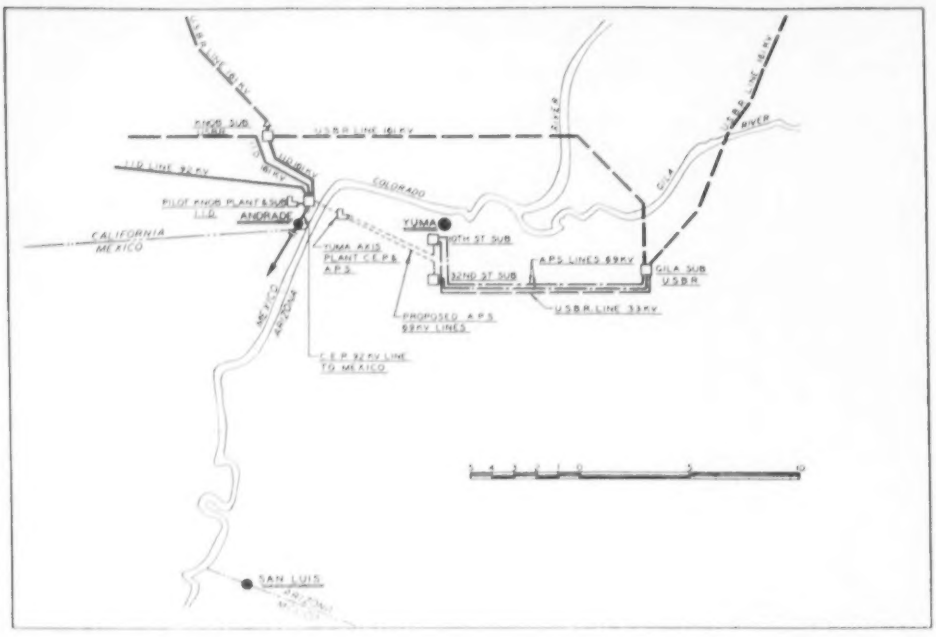
Three Western utility organizations have announced a cooperative plan to meet new load demands in southwestern Arizona, southeastern California and northern Mexico. As a result, the Yuma, Ariz., area will be the site of a new modern 160-megawatt thermal station which, by a unique coordination agreement, will supply energy demands for Arizona Public Service Co., the California Electric Power Co. and the Imperial Irrigation District, all of which have service areas in the lower Colorado River region.

Ownership of the new plant will be unusual as it will literally and legally split down the middle. California Electric Power Co. will build, install and own the first 80,000-kw unit to be completed by 1959. Arizona Public Service will build and own the second unit scheduled for completion in 1962. Primary facilities for each company will be located on real estate owned by that company. There will, of course, be certain "common facilities" to be used by both parties. Equal investment by the two companies will cover these, mutual easements for their use being granted one to the other. The plant will be operated by Arizona Public Service Co.

Benefits of this cooperative plan are obvious. The engineers and designers will lay this plant out on a two-unit basis immediately despite the unit installation time lag of three years. The utilities expect to realize considerable savings with this feature, especially in foundation and substructure work as well as enjoying the efficiency benefits of a large modern station.

Steps Toward Coordination

For a complete understanding, a review of the background of operations of the three parties in the combined project is desirable. The map here shows the area with the interconnecting lines of all three parties



Plan of the Yuma-Axis area showing location of the various plants, substations and transmission lines that will integrate this new station in a three-way cooperative power program

including the USBR facilities.

Arizona Public Service Co. has its main system in the Phoenix area and a local system in the Yuma area, which are interconnected by the facilities of the USBR Parker-Davis transmission system in Arizona. The power supply for the Yuma area prior to development of the lower Colorado River projects was by local generation, principally diesel, and then augmented by hydro power from the Colorado. In recent years it has become necessary to wheel power into Yuma from the main system of Arizona Public Service Co. and the diesel plant has been taken out of service.

Imperial Irrigation District operates the electric system in Imperial County and elsewhere in southeastern California and it, too, is interconnected with the USBR Parker-Davis transmission system in southeastern California.

IID receives hydro power from the lower Colorado River projects, and has generating plants in the Imperial Valley, both steam and diesel.

California Electric Power Co.'s main system is in the San Bernardino area extending north into Nevada and east to the Colorado River at Blythe. It also is receiving power deliveries from the USBR Parker-Davis system and is interconnected with Imperial Irrigation District's local system and thence to its wholly owned subsidiary in northern Mexico, this interconnection to Imperial Irrigation District being the principal source of power supply for California Electric Power Co.'s Mexican operation.

As will be noted from the map, all these areas and sources are interconnected either by local lines or backbone transmission in the local systems as well as the USBR Parker-Davis system in both Arizona and California. The operators of these systems in the past have had various operating agreements for mutual assistance under emergency conditions and for some incidental power supply.

Arizona Public Service Co. has had under consideration for some time the building of a power plant in the Yuma area and discussions were had as far back as two years ago with California Electric Power Co. in connection with their future requirements in northern Mexico. At that time it was thought that a single power plant would be most practical with a sale being made from one party to another. As the timetable advanced and the local systems were studied further, it seemed to be a natural that the three parties should look into matters for a combined operation and a coordinated program. Studies were made of all system conditions and, from past operating experiences, it was realized by all parties that considerable more benefits could be realized by working out a carefully coordinated program such as represented by the new "partnership" agreement.

A Selected Paper

Chosen by PCEA Engineering and Operating guidance committee as a meritorious contribution to the section meeting.

Axis Agreement

This agreement between Arizona Public Service Co. and California Electric Power calls for building the power plant on a timetable basis, at a common site and to be operated by a single operating force. The word "axis" is derived from the fact that the power plant site will be divided into two tracts separated by an axis line, one tract to be owned by each company and equal cost to each with acreage approximately equal.

This agreement will be administered by what is known as an Axis Committee consisting of two members from each company with functions as follows:

1. Establish general policies
2. Supervise operation of plant
3. Supervise plant operator
4. Coordinate operation of plant with coordination agreement

The benefits to the parties under these agreements are obvious. The plant will connect to the USBR Parker-Davis system, thus strengthening the whole interconnected system in the area.

Coordination Agreement

This agreement between all parties involved provides for cooperation in the development and operation of their respective electric sys-

Table 1—How to Divide Capacity on a "Partnership" Station
Typical Calculation

Line		Total	Megawatts IID	CEP	APS
1	Equalization demand	257	139	64	54
2	Reserve responsibility	80	43	20	17
3	Capacity required	337	182	84	71
4	Accredited capacity of local sources				
5	Generation	149	149	..	..
6	Purchases	45	30	15	..
7	Firm wheeling	23	..	..	23
		217	179	15	23
8	Main system responsibility	40	..	22	18
9	Total excluded participation	257	179	37	41
10	Participation capacity	80	3	47	30
		337	182	84	31
11	Participation percentage (Line 10 divided by 2)	100%	4%	59%	37%

The first item is the demand of the respective companies and then totalized. The second is the reserve responsibility and, of course, is related to the capacity of the first unit. Summation of these two items gives capacity requirements. Next take the accredited capacity of the local sources for each of the participants, which are generation, purchases and firm wheeling available, and totalize each one. To these totals has to be added a quantity that has to be derived from the main system (main system responsibility) in order to get the total quantity to tie back to equalization demand. Next the participation capacity is added to balance the capacity required and then the percentage obtained for each party as shown on the last line of the table, namely, IID 4%, CEP 59% and APS 37%.

tems, participation in use of new generating units installed, coordinated load dispatching, scheduling of power deliveries, provisions for carrying reserves and many of the other items, such as economy, interchange and emergency assistance. This agreement will be administered by a coordinating committee of three members, one designated by each party with duties as outlined below:

1. Establish general policies
2. Review power requirements of the parties
3. Recommend changes and additions
4. Supervise operating committee

Under the agreement there is a second committee called the "operating committee," two members as representatives for each party. This committee, too, functions as follows:

1. Establish procedures and practices of operation
2. Establish procedures and practices of cost determination, expenses, losses, energy transactions
3. Metering arrangements
4. Keep coordinating committee informed

The question of how to divide the capacity in such a plant between the participating parties is solved by methods illustrated in Table 1.

Such a table is worked up for each year's operation by the operating committee and this system is used continuously from year to year. Each participation agreement is only good for the period agreed upon by the parties and when more capacity is required in the plant a new participation agreement must be drawn up for the second unit. Then it operates in a similar fashion. The unit installed under the first participation agreement then reverts back to the owner for his sole use or as agreed upon at the subsequent date.

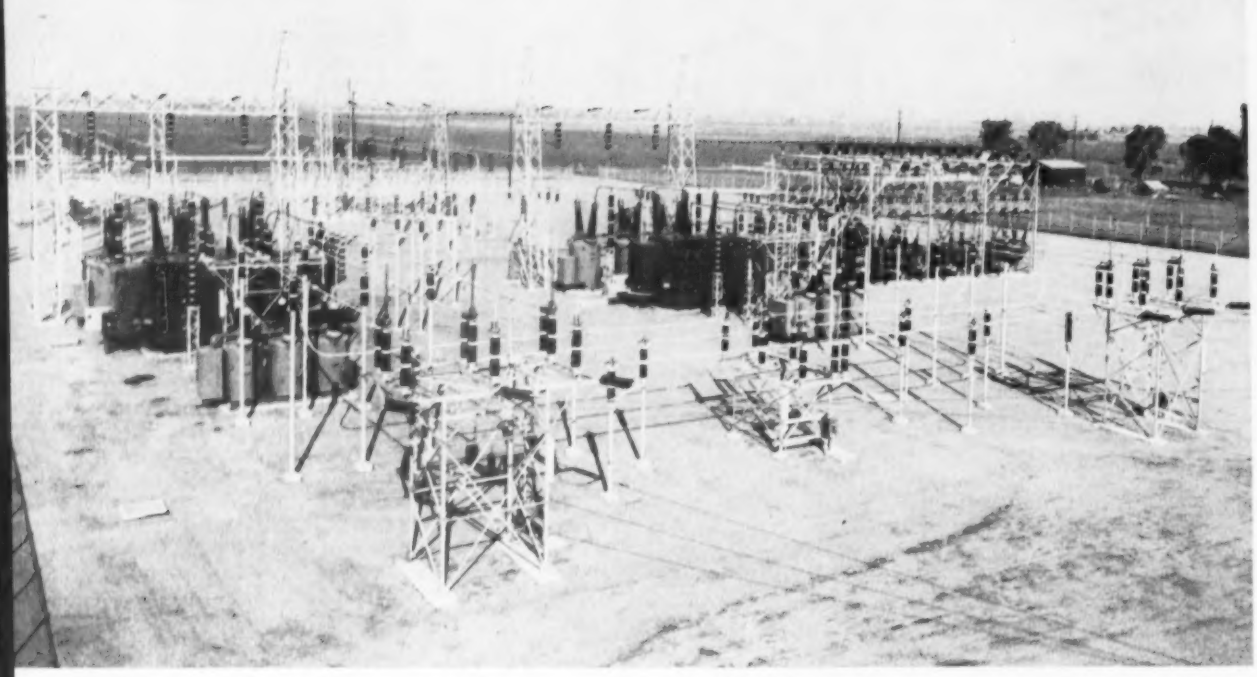
Officials of the three companies stated that the formation of this power pool reflects cooperative long-range planning to insure continued growth for their service areas in the two states. It means more efficient utilization of facilities and, in the ultimate, service to the customer at the lowest cost.

Transmission lines will be provided, in relation to existing facilities either owned by one of the utilities or the bureau, so as to facilitate the pooling plan. As an initial step, Arizona Public Service proposes to build two 69-kv lines from the plant site to substations in Yuma. These lines will provide a tie to the bureau's system south of Yuma over which power will be wheeled to Calectric's system in the San Luis, Mex., area.

Another major line will be built from the Yuma-Axis plant in Arizona to Imperial Irrigation's Pilot Knob substation across the Colorado River in California. This will provide a second tie line to Imperial Irrigation's 161-kv line to El Centro, Calif. The existing tie consists of 33-kv and 161-kv lines operated by the bureau. Over one or both of these ties, power can be transmitted to Imperial Irrigation's system in Imperial Valley and to Calectric's system in and south of Mexicali, Mex.

REACTOR CORE—This is a reactor core tank being lowered into its liner at the Arco, Idaho, reactor testing station of AEC. Investigation of the organic moderated type of reactor as a large power producer will be undertaken. Flanges on the lower right side are for inlet and outlet pipes circulating the organic fluid through the core

$6.45 Per Kva—Installed



SMUD's 320,000 kva 69/115/230-kv Elverta substation showing outgoing 115-kv lines

Charles R. Day
Supervising Electrical Engineer
Sacramento Municipal Utility District

The availability of a specific block of bulk power at the 230-kv buses of a Bureau of Reclamation switching station combined with the Sacramento Municipal Utility District's need for this power in both its 115-kv transmission and 69-kv subtransmission systems led SMUD to design and construct a large supply substation with some noteworthy features. Known as Elverta substation, it is located approximately 10 miles north of the city of Sacramento, Calif. Firm capacity is considered to be 320,000 kva utilizing two three-phase transformers in a duplex arrangement patterned after that used with small distribution unit substations.

Most unusual feature of the station is loading of the transformers at both 115 kv and 69 kv. The station is unattended and is provided with control features for completely automatic operation, including transfer of the entire load to one transformer in case of loss of any component on the other side. Supervisory control is available for overriding automatic features if desired.

A schematic one-line diagram of the station is shown. Power is received from the Bureau of Reclamation 230-kv buses through metering points at X. Bus protection is provided by including the SMUD 230-kv OCBs in the Bureau of Reclamation's bus differential zone.

Percentage differential relays are provided to initiate isolation of either transformer and its accompanying 115-kv and 69-kv buses under bus or transformer fault conditions. The 230-kv, 115-kv and three 69-kv OCBs enclosing the differential zone on the faulted side are opened by action of a master auxiliary trip relay, which in turn calls for closing of the 115-kv bus tie switch and the three 69-kv feeder tie switches. This automatic transfer places all load on the remaining good transformer and buses.

Impedance relays "look into" the two 115-kv outgoing lines and initiate operation of the 115-kv OCB to isolate a faulted line. If automatic reclosing after the initial OCB operation is not successful, additional automatic functions are performed in a sequence that results in isolation of the faulted line and both transformers feeding into the one remaining good 115-kv line with the bus tie switch closed.

High-speed overcurrent relays protect the station against faults on 69-kv outgoing feeders.

Buses and Switchgear

All 230-kv buses and disconnect switches were designed for a BIL of 900 kv. Main and auxiliary buses, as well as bus ties, are of the rigid pedestal-supported type utilizing 4-in. IPS aluminum tube with bolted connectors and terminals. "Damping" to reduce vibration of rigid buses was effected by inserting loose runs of 4/0 AWG stranded polyethylene covered aluminum cable inside the buses before installation of the end bells. Overhead ground wires are provided parallel to bus sections for protection against direct lightning strokes.

The 230-kv OCBs are rated 1,200 amp with an interrupting capacity of 7,500 mva. Interrupting time and reclosing time are three cycles and 20 cycles respectively.

The 115-kv and 69-kv buses are similar in design and construction to the 230-kv except for use of 2½-in. IPS aluminum tube. Standard equipment BILs of 550 kv and 350 kv were used for 115-kv and 69-kv buses and switches.

Transformers

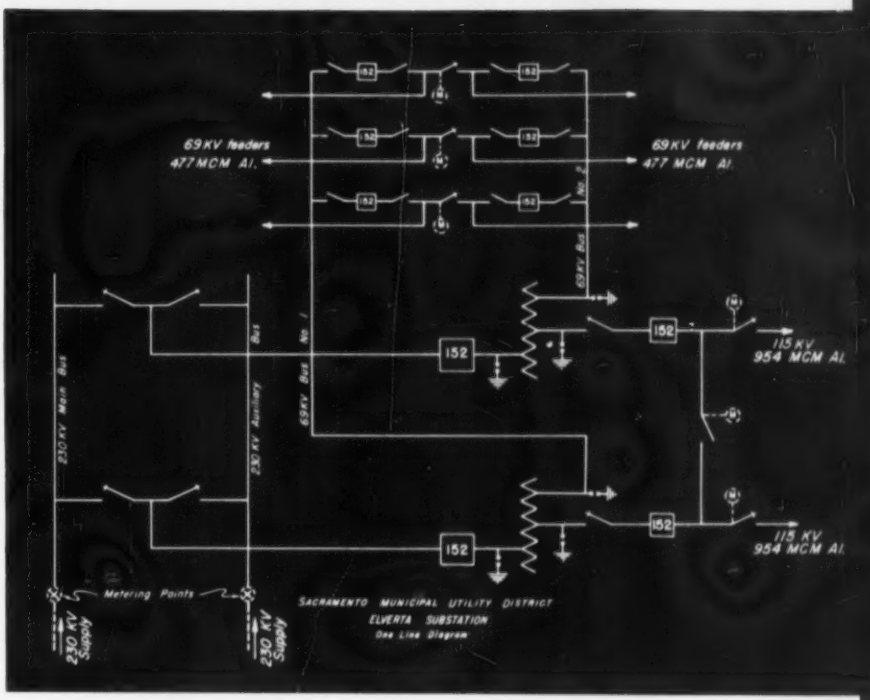
The two transformers are three-phase, four winding double auto-transformation units. They are wye-wye connected with a delta tertiary winding for harmonic suppression and neutral stabilization only. They have a primary voltage rating of 230 kv and each delivers load simultaneously to its associated 115-kv and 69-kv buses.

Each transformer has a FOA-T name-plate rating of 185,000 kva with seven cooler units operating and a supplemental rating of 241,000 kva with the full complement of 14 cooler units operating. Design is based on a division of load of 54% on the 115-kv windings and 46% on the 69-kv windings. However, the built-in "teeter-totter" effect of such an autotransformer allows for a division of simultaneous loading varying in this case as follows:

	Loading Limits	
	115 kv	69 kv
Max. 115-kv load	67%	33%
Max. 69-kv load	43%	57%

This makes for an obviously flexible operation that will, it is hoped, take care of the vagaries of system load growth.

The 69-kv windings only are provided with "load tap changing" equipment to give 7½% regulation above and below nominal bus voltage, which is maintained at approximately 71.5 kv.



Elverta sub one-line shows how the autotransformers relate 69/115/230 systems

View from the 230-kv side shows two lines entering through metering CTs, right

Transformer Protection

Since the two transformers represent an investment of approximately $1 1/3 million, all possible protection for them has been provided. In addition to the station overhead ground wire system, station-type lightning arresters were installed at all transformer terminals. Besides the transformer differential relays, fault pressure relays were incorpo-

rated into each of the three separate oil compartments in each transformer. Supervisory control alarms were provided for low liquid level, fan and pump undervoltage, oil differential pressure, winding hot spot temperature, top oil temperature, low gas pressure and pressure relief device.

These transformers are reputed to be physically the *largest west of the Mississippi River*. Each has a gross weight of 521,000 lb and maximum over-all dimensions of 37 ft in width, 19 ft in depth and 24 ft in height over bushings.

Station Loading

It is planned ultimately to load the station to the contract maximum of 290 mw at 90% pf (320 mva). With the ability of the station to transfer automatically all load to the remaining good side after loss of one side, it is recognized that considerable overload will be imposed on the remaining transformer. However, computations indicate that the possible loss of transformer life incurred with an overload of this magnitude is very nominal and it would be planned to hold the period of such emergency operation to the time required to transfer a portion of the load to another available source.

Oil Handling

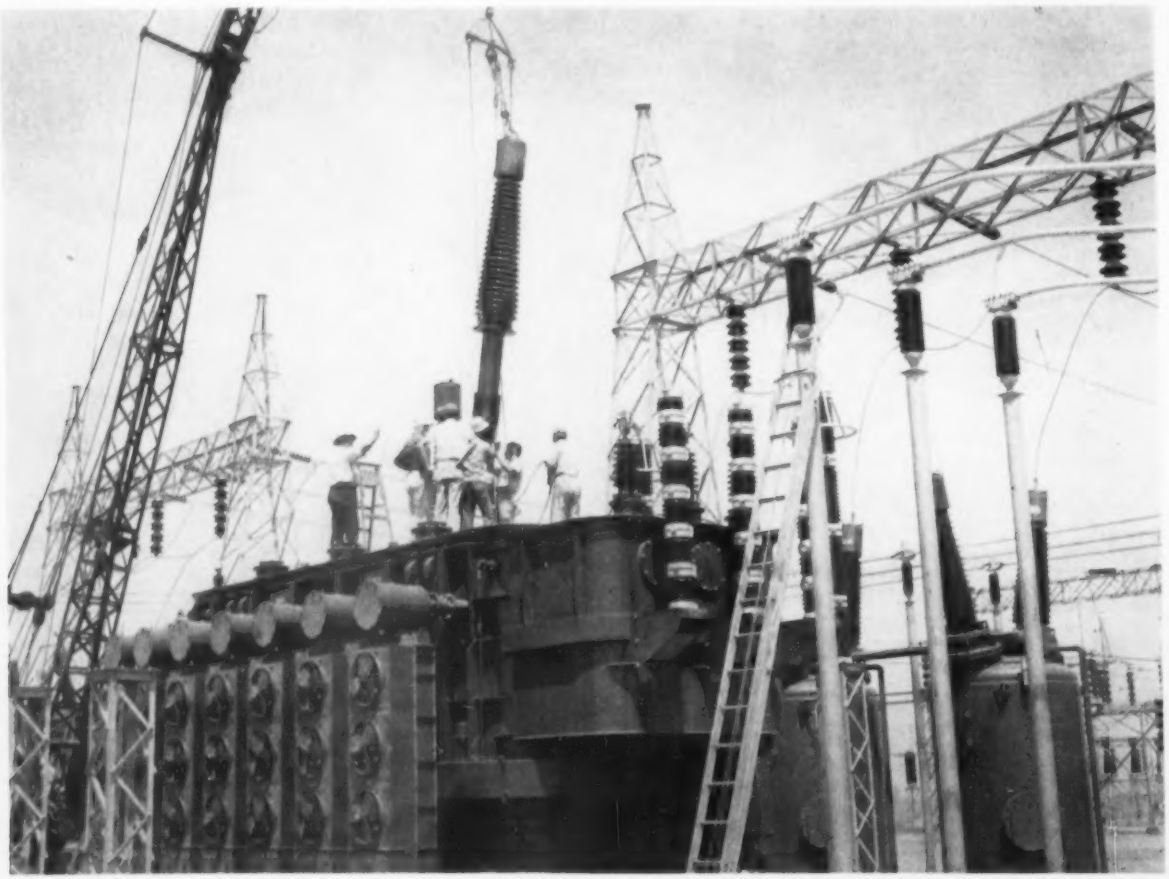
It may be of interest to note that oil in all station breakers and transformers totals in excess of 70,000 gal and in spite of this large quantity *no oil storage or piping facilities* have been provided at the site. Accessibility of the station, availability of modern tank trucking equipment and the proximity (75 miles) of large refineries with storage tanks all led to the decision to forego the usual expensive oil handling facilities associated with a station of this magnitude and importance. A mobile compartmented tank-trailer is available with sufficient capacity to remove, filter and return the oil of the largest circuit breaker tank in the station. However, when it be required to remove or filter, or both, the oil in one of the transformers, which totals 17,000 gal, it will be necessary to rent equipment and storage facilities.

Before deciding on the duplex scheme with three-phase, double-autotransformation units, other more conventional schemes were considered for the station, such as:

1. Use of separate three-phase banks for transforming 115 kv and 69 kv capacity direct from the 230 kv.
2. Use of three-phase banks to transform the entire load from 230 kv to 115-kv with a second transformation from 115 kv to 69 kv.
3. Use of single-phase transformers with schemes No. 1 and No. 2.

Total investment in the Elverta substation, as built, exclusive of land, amounts to $2,063,000 or approximately $6.45 per kva. Based on the firm capacity of 320,000 kva, this cost represents a substantial saving over that which would have been incurred with use of other schemes considered.

A total elapsed time of 2½ years was required for complete design, delivery of equipment and construction of the station, which was placed in service in February 1956.



Six men have plenty of room on top of the 185/241-mva autotransformers, the largest west of the Mississippi River

The Duncan Bay hauling 200 boxcars of noodle pulp. The pulp is unloaded by adding and pumping to storage areas

Turbines, a-c and d-c motors pull together. A boat carries oodles of noodles. Crown Zellerbach's new plant is

Built to Serve

Crown Zellerbach is a customer-minded outfit. The people there believe a mill should be close to its market, to shorten deliveries and give better service.

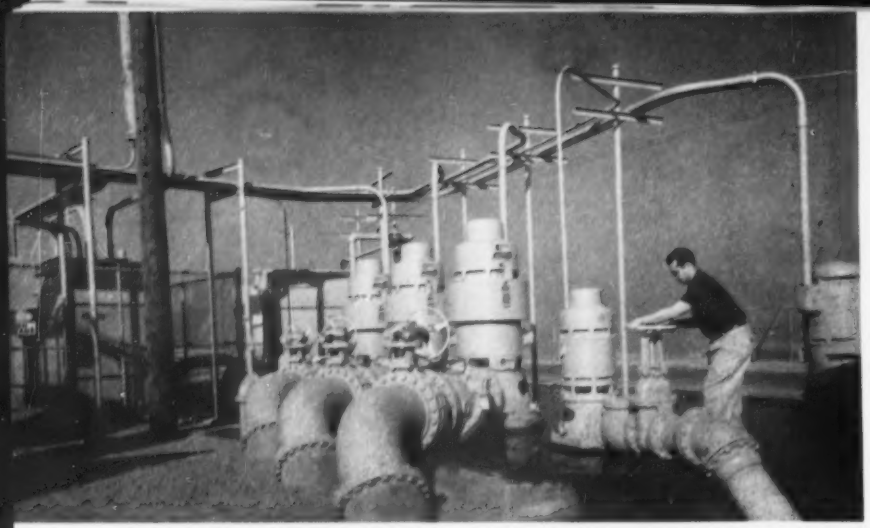
To place a new mill near the center of a prime marketing area, they built it on the San Joaquin River about 35 miles from San Francisco. The capacity of the plant is 400 tons of kraft paper and board per day. The paper machine in this mill is the largest in Western United States. Cost of the mill was $18,500,000. These facilities will soon be bolstered by a corrugating plant, a bag plant and a tissue and toweling plant. The West will be well served.

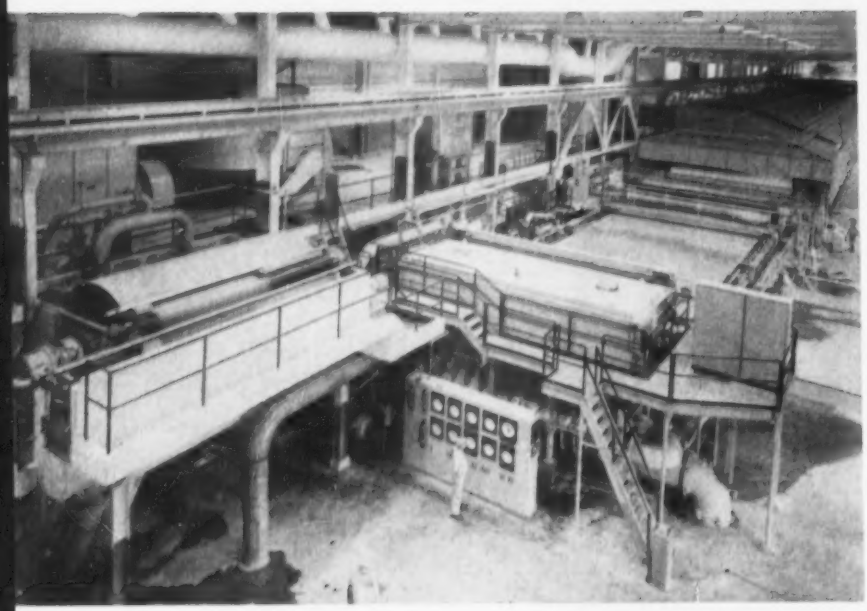
All pulp for the mill is brought by ship from the large Crown Zellerbach Elk Falls pulp plant on Vancouver Island, B. C., some 1,100 miles distant. It comes via the first pulp tanker ever commissioned, the SS *Duncan Bay*. The ship makes three round trips a month and each time delivers a 14,500-ton cargo of "noodle" pulp, the papermakers' name for wet wood fibers as they come from the pulping mill. To ship an equal amount of pulp by rail would require approximately 200 boxcars!

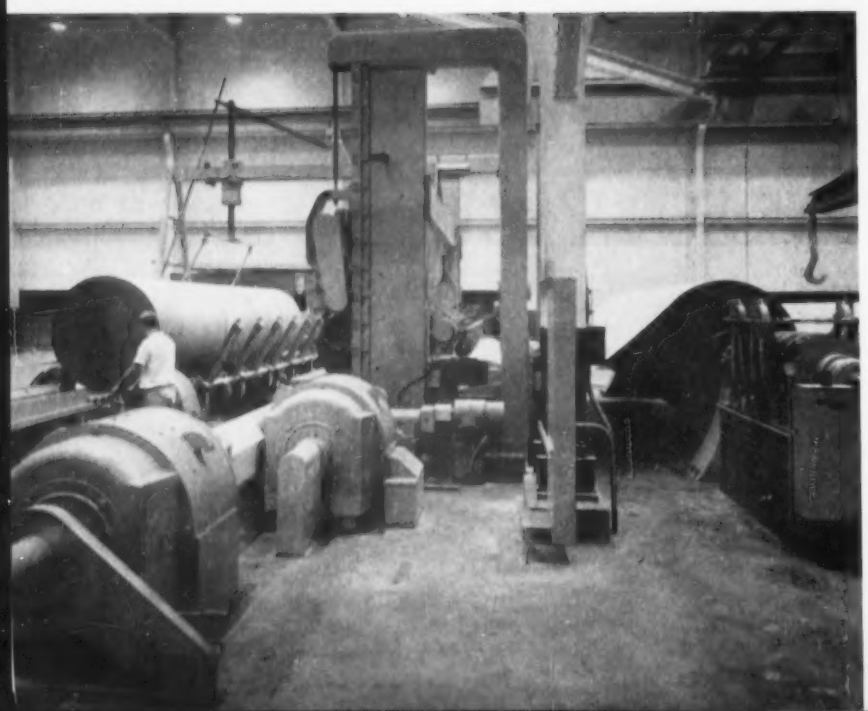
Pumps Unload Pulp

Unloading of the *Duncan Bay* at Antioch is accomplished by hydraulic means. The noodle pulp in the nine holds of the ship is about 65% water and 35% fiber. Being much too dry for pumping, means have been set up for increasing the water content to about 98%, which provides a sufficient degree of fluidity for pumping. A large quantity of water is involved, all of which is drawn from the San Joaquin River. Three 200-hp vertical pumps deliver the river water, via the turbine condenser and purifiers. Clean water is then used for dilution of the noodle pulp and for processing.

A 30-in. supply and header line delivers purified water to the *Duncan Bay* through a series of four inlet pipes leading to a shipboard tank. Ship's pumps force water into the bottom of the holds and as dilution







takes place the now fluid pulp is drawn from the holds through lines connected with the 42-in. discharge header. Pressure dilution lines supply jets, which can be directed into the holds from above when the hatches are open.

The dilute stock passes to a take-up storage tank, thence to vacuum screens or deckers that reduce the water content to about 75%. Each of the three deckers is driven by a d-c speed variator unit. The dewatered pulp is carried on a system of conveyors to a traveling centrifugal spreader, similar to a ship's trimmer, that distributes the pulp to whatever area of the 1,000-ft concrete storage basin is selected and to whatever depth desired. A second conveyor system, loaded from the basin by bulldozer, moves pulp as needed into three high-density storage tanks near the mill.

Power for water supply and fire pumps is provided by a 750-kva, 13.8-kv/480-v metal-enclosed outdoor unit substation. The various unloading dock and storage area drives are supplied by a similar substation of 1,500 kva capacity.

Stock is supplied to the paper machine from the high-density storage tanks through a system including pulpers, screening and a battery of five claflins and six jordans. (That's paper talk for refiners.)

Turbine Main Drive

The 260-in. Fourdinier paper machine is line-shaft driven with electric helper drives on the wet end and size press. The prime mover is a 2,400-hp geared turbine, seven-to-one speed range with power takeoff in both directions. "Little David," as it might be called, is located about halfway between the wet and dry ends of the 440-ft-long "Big Goliath" paper machine it drives. Top paper speed is 2,500 fpm. The turbine governor holds speed constant to ¼ of 1% of full load speed at all points over the speed range. Initial steam pressure is 580-600 psi, back pressure 60 lb. Exhaust steam supplies heat for the drying rolls of the paper machine. Additional process steam is available as needed by extraction from the turbine of the electric power plant.

The wet end electric helper drive consists of a 400-kw d-c generator

Top, pump handling of pulp cuts costs. San Joaquin River water is purified for use. Center, the paper machine is 440 ft from wet to dry ends. Below, finished paper is slit and rewound into the proper sized rolls by large direct current motor

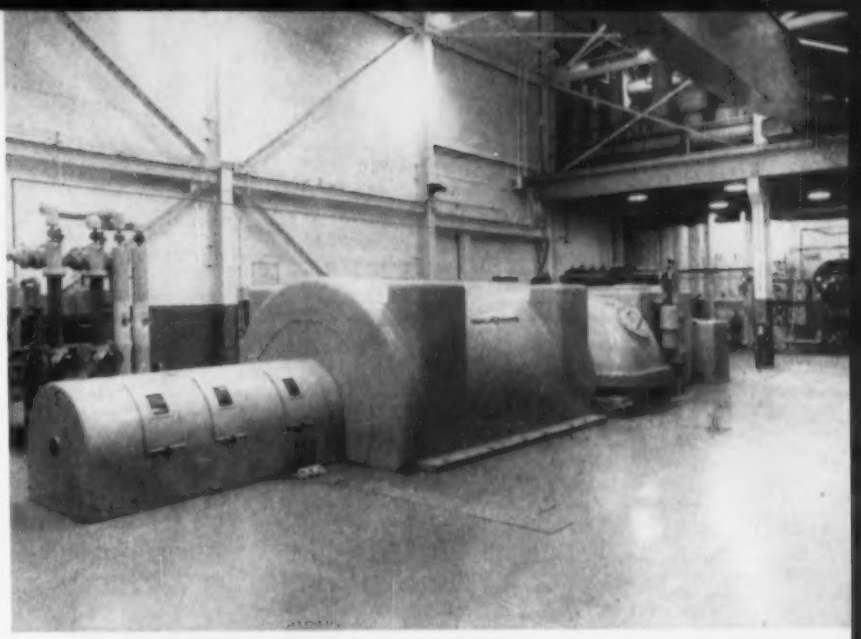
drive from the line shaft, a motor-driven series booster generator, an Amplistat magnetic amplifier control panel and four d-c motors. Three of these motors are rated 150 hp and drive the vacuum couch roll and two wire return rolls, respectively. The fourth motor is 15 hp and drives the lump breaker roll. Under the direction of the Amplistat panel, each of the four motors automatically delivers constant torque to the system at proper speed over the full range of line shaft speed. The 40-hp-size press helper drive is supplied from a d-c generator on the same shaft as the booster generator. These generators are driven by a 150-hp, 2,300-v induction motor.

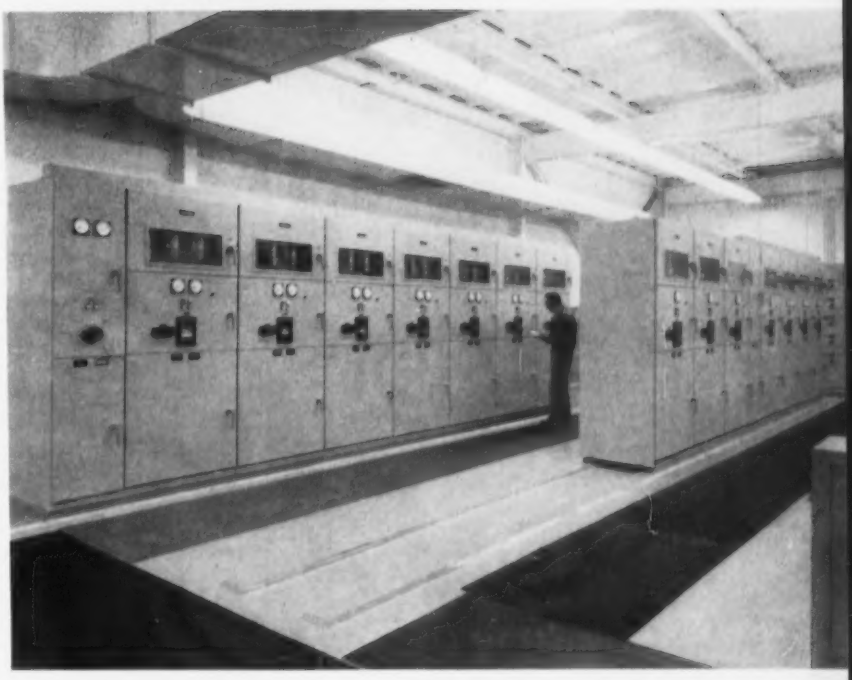
Various wet-end auxiliaries requiring adjustable speed are equipped with d-c speed variator drives. The multitude of constant speed auxiliaries are driven by a-c motors with controls grouped in steel-enclosed motor control centers.

A striking and most flexible drive is found on the winder. This unit takes the loose reels as they come off the paper machine and winds the paper into tight, even rolls. As the paper goes through the winder, it is slit into desired widths. The winder, capable of handling paper at 5,000 fpm, is driven by two 200-hp d-c motors supplied by a 400-kw motor-generator set. The control console includes the hydraulic, as well as electric, controls in one pulpit-type unit.

A rewinder is installed in the storage area. It is capable of 4,000 fpm and is driven by a 150-hp d-c motor with 150-kw supply motor-generator set. The rewinder's principal function is to reclaim usable paper from rolls which for reasons of damage, size, quality, etc., cannot be used as is.

Interior lighting of the mill is accomplished by 400-w color corrected mercury vapor lamps. The lighting is augmented by attractive painting of walls and ceiling. Exterior working and traffic areas are illuminated with flood and street-type mercury vapor luminaires. The office building is of modern design, well lighted and attractively decorated, inside and out.





The plant's 15,625-kva generator yields up to 200,000-lb steam per hour by automatic extraction for processing. Below, motor control panels for 2,300-v motors

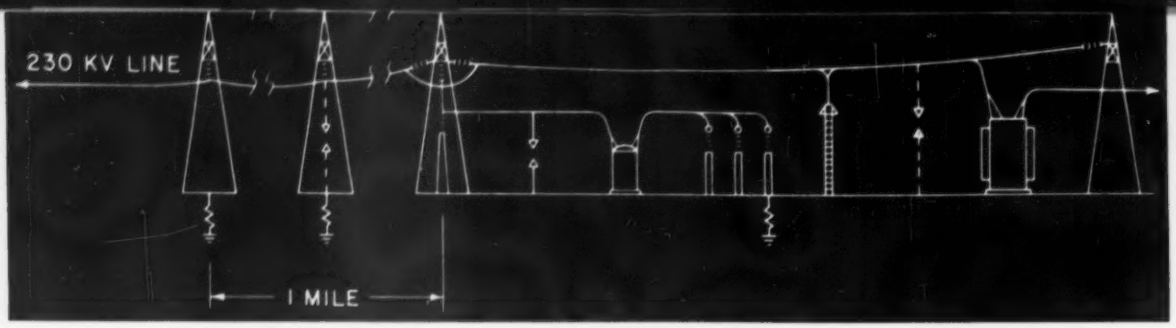
The Power System

Electric power requirements for the entire mill are supplied at 13,800 v by a 15,625-kva turbine-generator with automatic extraction of as much as 200,000 lb of steam per hour at 160-lb gage for process use. The total amount of power required is approximately 21,000 kva or about the same as a city of 30,000 people.

The electric power distribution system is 13.8-kv grounded neutral beginning at the breaker lineup in the turbine room. These breakers are rated 1,200 amp, 500,000-kva IC. A tie is provided for connection with PG and E through a 22/13.8-kv, 2,500-kva transformer.

Distribution is by cable in conduit to terminating points outside the power house, thence with bare copper aerial lines or three-conductor self-supporting cable. Sectionalizing and lightning protection is provided for the overhead lines. Surge protection is provided for the generator. Fifteen load center unit substations in sizes 500 to 3,750 kva and totaling 19,500 kva are located at points of load concentration about the mill and reduce distribution voltage to utilization level. Total connected horsepower is approximately 22,000.

People who have watched C-Z zoom are not surprised to see them engineer a plant to carry out a marketing concept. When you see it produce it makes sense.

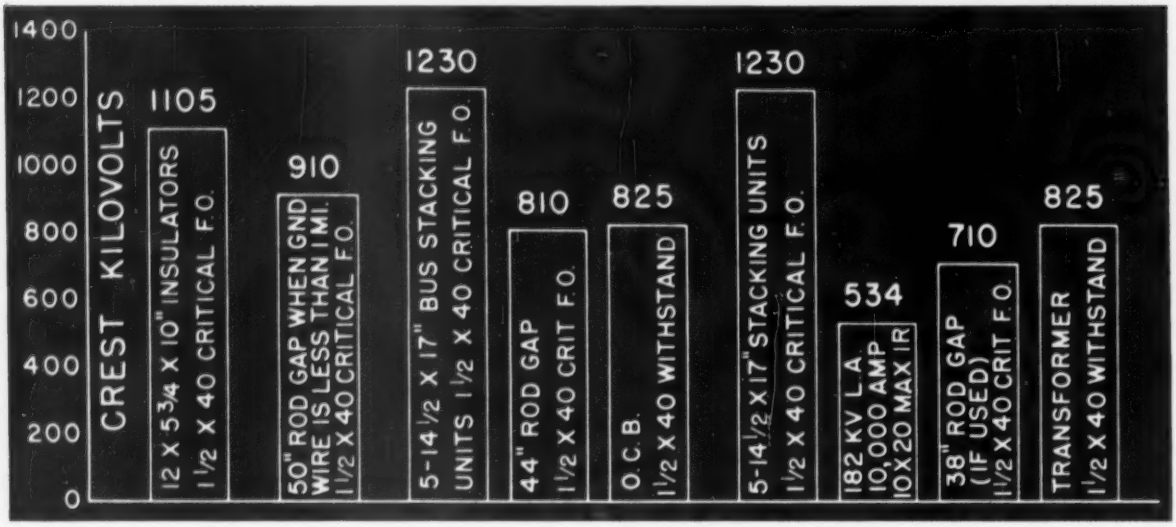


A critical review of lightning experience in the Northwest proves that . . .

Protection Planning Pays

Edward H. Gehrig and Ralph S. Gens

Bonneville Power Administration
Portland, Ore.



Protection of a power system against overvoltage must necessarily reflect the kind and frequency of overvoltage on the system. BPA system engineers, in following this idea, have been able to make substantial savings in protective schemes. Our present-day standards appear to be adequate for areas with three to thirty lightning storms per year. In addition, today's practice gives a maximum of protection per dollar invested.

The Plan

Since transformer insulation is a most costly form of overvoltage protection, transformer basic impulse levels (BIL) were reduced. On 230-kv systems the insulation was reduced from 1,050 kv to 900 kv and presently to 825 kv. Purchase of 750-kv transformers, two steps down, are under consideration.

Studies indicated that it would be possible to eliminate continuous overhead ground wires on the 230-kv grid if breakers with automatic high-speed reclosers were used. Thus a lightning stroke would travel along a line only to flashover at a structure to establish a phase-to-ground fault. The circuit breaker would relay open by the fault and then reclose. Overhead ground wires are only installed within one-half to one mile of the stations. Their use here is to prevent strikes near to substations and to attenuate the magnitude and decrease the rate of rise of incoming wires.

Gaps Used

Because the system relaying was used in conjunction with the power breakers to extinguish power current following a flashover, the addition of inexpensive rod gaps as protective devices became feasible. This rod gap establishes an additional flashover point. The breakers operate only once to clear the follow current created by this and other flashovers on the lines. Thus an inexpensive gap and standard circuit protective device in some cases supplant lightning arresters.

The progress in station arresters that enabled us to reduce transformer BILs was coupled with improvements in line-type arresters, which opened the door for further reductions in the protective investment.

Of some interest in our practice not to use any arrester where four or more lines terminate on an unsectionalized bus—even where associated transforming equipment is 825 BIL. This is because the incoming wave divides in magnitude at the juncture of the lines.

These ideas explain the approaches that have enabled us to make considerable gains toward lower-cost protection. In a given station, size, growth potential or

lightning incidence may dictate minor changes. The gains in general are shown in Table 1. Most important, operating experience indicates that these approaches do not reduce the continuity of service demanded from a present-day power system.

Two Problems

Two problems associated with future lightning protection planning seem to be worthy of the industry's consideration.

1. With a marked industry trend toward reduced transformer insulations, additional reliance is placed on arresters to protect these major system investments. But will the arrester work? This remark is not to cast doubt on any equipment but to demonstrate the desirability of having maintenance tests and testing standards devised. In short, it is comforting for the operating man to be able to be sure that the safety device will not fail when required to operate.

2. As system voltages increase and the spread between 60-cycle operating voltage and impulse breakdown decreases, it is reasonable to expect that the most severe duty on an arrester will not be lightning—but the discharge of long lines as the result of switching surges. This type of service may subject arresters to 600-plus amp for 2,000 or more microseconds. At 345 kv this is a considerable challenge to an arrester's thermal design. For this reason it would appear that arrester standards should cover ratings for this very real service hazard.

The return on the investment of engineering manpower in the study of overvoltage protection has been most satisfying personally and profitable in a business sense. And perhaps this is just the beginning.

Past and Present Insulation Coordination Practices

	115-kv System				230-kv System			
	Previous Practice Flashover kv		Present Practice Flashover kv		Previous Practice Flashover kv		Present Practice Flashover kv	
Line insulation 5¾x10 in. Suspension Units								
Steel	8	760	7	670	16	1,425	14	1,275
Wood	7	670	6	585			12	1,105
Rod gaps at entrance of groundwire if groundwire is less than specified length	Not used—groundwire always specified length		25 in.	490	Not used—groundwire always specified length		50 in.	910
OCB insulation	550 kv	550 min.	450 kv	450 min.	1,050 kv	1,050 min.	825 kv	825 min.
Rod gap for OCB protection	Not used		19 in.	375-400	Not used		44 in.	810
Station insulation level—14½-in. stacking units	550 kv	770	550 kv	770	900 kv	1,230	900 kv	1,230
Transformer insulation—full wave 1½x40	550 kv	550 min.	450 kv	450 min.	1,050 kv	1,050 min.	825 kv	825 min.
Rod gap for transformer protection if arresters are not used	Arresters always used		16 in.	325-360	Arresters always used		38 in.	710
Lightning arrester rating—max. sparkover 1½x40	121 kv		90 kv		196 kv		182 kv	
Max. IR level at 10,000 amp—10x10 wave in parenthesis	468	(506)	372	(273)	750	(809)	612	(534)

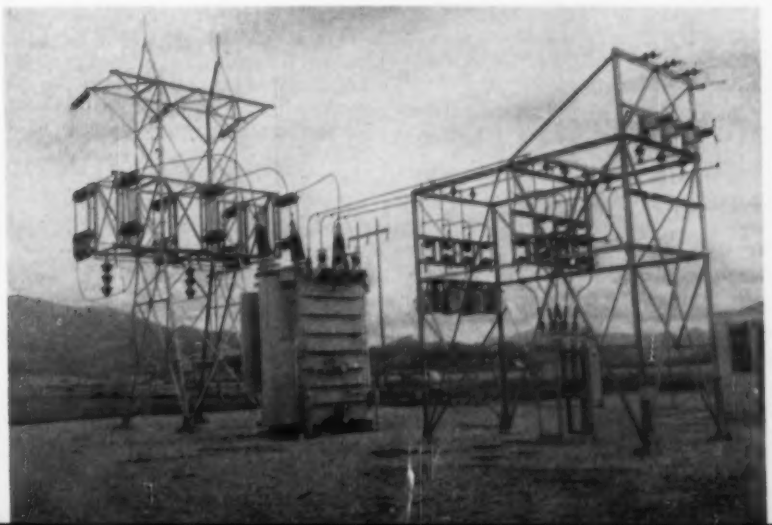
All Flashover Values Are for Critical 1½x40 Microsecond Negative Impulse Wave

Cost of Lightning Protective Equipment

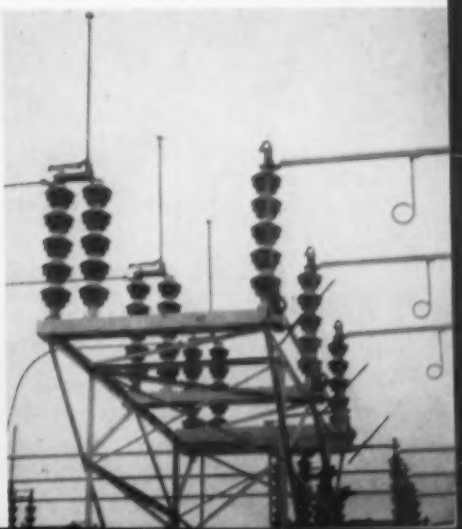
Transformer Kva	Transformer Kv	Cost($)	Ground Mats($)	Overhead Ground-wires($)	Rod Gaps($)	Lightning Arrester($)	Total($)	Ratio of Protective Equipment to Transformer Cost
6,000	115	48,000	1,600	.....	120		1,720	3.59%
12,000	115	82,000	1,600	.....	.....	2,250	3,850	4.70%
20,000	115	110,000	1,600	1,550*	.....	2,250	5,400	4.90%
150,000	230	600,000	7,500	5,000†	.....	10,900	23,400	3.90%
150,000	230	600,000	7,500	10,000	200		17,700	2.95%

*Average 1 line per substation.
†Average 2 lines per substation.
Station shield wires not included.

A 115-kv station less than 6,000 kva showing the use of rod gaps as only protection



Rod gaps for 230-kv breaker protection



Jack Washichek and George Peak gage snow depth at Alta, Utah. These measurements are used to forecast water supply

Snow survey in Western states

Tells Water Supply Outlook

Homer J. Stockwell

Snow Survey Supervisor, Soil Conservation Service
Fort Collins, Colo.

Norman S. Hall

Snow Survey Supervisor, Soil Conservation Service
Reno, Nev.

Except in a few isolated areas of western United States, 1957 streamflow from snow melt will be less than it was last year.

No extremely heavy snow pack was measured in the Pacific Northwest mountains this April 1 as contrasted to extremely heavy snow packs found there a year ago. Water supplies for irrigation and power over the states of Montana, Idaho, Oregon and Washington are expected to be reasonably adequate to meet demands.

In the extreme drought areas of the southwest there generally has been some improvement over a year ago, but the shortage of water is definitely serious. Prospective supplies for parts of Colorado, Utah and California will be deficient. Severe shortages, comparable to the past two years or more, are in prospect for New Mexico and Arizona. Streamflow will be below average for most areas in California. Late season shortages may be expected where carry-over storage is not adequate.

Storage in nearly all power reservoirs is less than a year ago. In California and on the Columbia River, reservoirs used for power generally contain about three-quarters of the water stored in 1956. Inflow to Columbia River reservoirs will be adequate this year, but in California the below normal inflow during the summer of 1957 may have an adverse effect on next year's power operations. Storage in Lake Mead on the Colorado River is now 11,502,000 acre-ft as compared to 10,720,000 on April 1, 1956. Inflow to Lake Mead is expected to be near normal for this season. If present operating plans are continued, storage should increase during the next year. This will depend on power and irrigation operating plans at Hoover Dam.

Because of heavy seasonal streamflow, carry over in conservation reservoirs in the Northwest is well above normal and a year ago. Elsewhere in the West this storage does not exceed that for this date in 1956, and is substantially less than the 1938-52 average.

Forecasts of 1957 water supplies in the West are based on April 1 measurements by the U. S. Department of Agriculture, Soil Conservation Service and many other * organizations on about 1,300 snow courses. Water content of the snow, soil moisture conditions under the snow as well as in irrigated areas, and the amount of carry-over storage in nearly 200 reservoirs, are considered in appraising the supply outlook.

Although runoff will be about

* The Soil Conservation Service coordinates snow surveys conducted by its staff and many cooperators, including the Bureau of Reclamation, Forest Service, Geological Survey, other federal bureaus, various departments of the several states, irrigation districts, power companies and others. The California State Department of Water Resources, which conducts snow surveys in that state, contributed the California figures appearing in this article. The Water Rights Branch, British Columbia Department of Lands and Forests, has charge of the snow surveys in that province and likewise contributed the information here for British Columbia.

average in the Pacific Northwest, only isolated areas will experience water shortages. Water supplies will exceed the usual demands along the main streams in Montana, Idaho, Washington and Oregon. As usual, some shortages are expected on smaller tributaries without adequate storage. Because of heavy streamflow last year, and the resulting carry over, storage in irrigation reservoirs is above normal. Mountain soils are wet and soils in irrigated areas are in fair to good condition as far as moisture is concerned. This favorable outlook extends from the Northwest to northern and central Utah and the Colorado River drainage of western Wyoming and Colorado.

Mild water shortages may occur on Wyoming and Colorado streams, east of the Continental Divide. Winter snow pack has been much above normal, but years of drought have reduced the amount of water to be expected from a generous snow pack. Unless summer rainfall is above normal, rather severe shortages of water will be experienced on the lower reaches of the South Platte in Colorado and the Arkansas in Colorado and Kansas. Soil moisture conditions, particularly near the mountains, were improved by major early April storms on the plains.

The outlook for the Rio Grande in New Mexico is substantially improved over 1956 but continued water shortages will be experienced, especially in New Mexico. In Arizona, the water supply is again critical, similar to the past several years. Water demands far outstrip surface supply. Less reservoir storage is available than for any recent year. No surface water is available from San Carlos reservoir on the Gila River. It's dry! Extensive use of ground water to supplement surface water for irrigation will be needed in New Mexico and Arizona. The prospective lack of streamflow extends to southern parts of Utah and Nevada.

Streamflow in California and Nevada will be below normal. In California's Central Valley surface water may become critically short in late season on streams which do not have carry-over storage. Shortage may also be expected for coastal areas and southern California. Considerable dependence will be placed on importations. In Nevada, irrigation season water supplies will be normal in Paradise Valley, north of Winnemucca, and fair to poor in other areas depending on storage rights.

Forecasts for the major streams of the West for the April-September 1957 period as compared to normal, include:

Columbia River at The Dalles, 104,000,000 acre-ft or 107%; Missouri River at Toston, 2,040,000 acre-ft or 80%; Colorado River at Grand Canyon, 10,100,000 acre-ft or 100%; Rio Grande at Otowi Bridge, 700,000 acre-ft or 82%; Sacramento River inflow to Shasta reservoir, 1,650,000 acre-ft or 89%; San Joaquin below Friant, 750,000 acre-ft or 59%.

The accompanying chart showing the status of reservoir storage and a map indicating the approximate runoff forecast for each area summarize the 1957 water supply outlook for the West. In the following paragraphs the water supply outlook by states is briefly reviewed:

Arizona—The shortage of water continues. Last fall was dry with reservoir storage critically low. Heavy precipitation in January was followed by warm weather which included early snow melt and a good yield of water was obtained. The flow of the Tonto River will be above average for the season, but

Deep, heavy snow pack in Utah awaits spring release, which will insure irrigation water for valley farmers

the over-all yield of the Salt and Verde River systems is expected to be about three-quarters of normal. The January storms were not effective on the Gila and San Francisco watersheds.

Total water available on the Salt and Verde Rivers will be enough to forestall any serious cutback of water for the Salt River Valley users. They will again have to draw heavily on underground water, further lowering the water table. Unless heavy rains occur, water in storage this fall will be very low.

No surface water from snow melt runoff will be available to users below San Carlos reservoir.

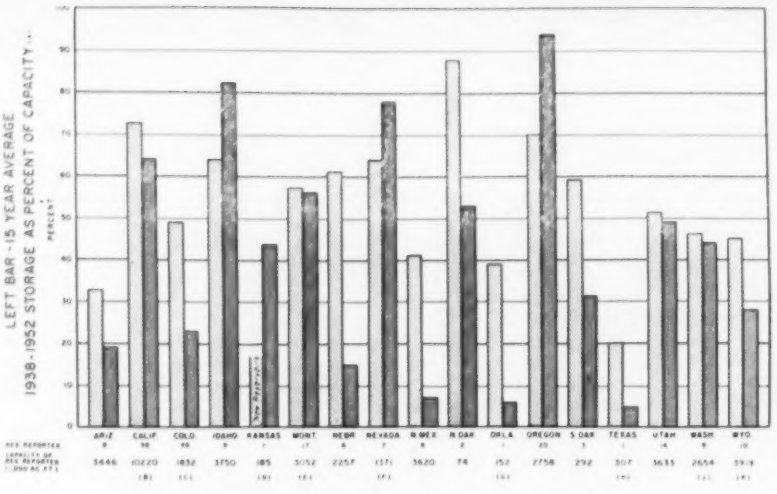
British Columbia—April 1 snow course readings reveal normal runoff for the southern mainland Coast, Kootenay, Columbia, and Fraser watersheds of British Columbia. Below normal water supplies are anticipated for the southern Okanagan, Similkameen, Skagit and Vancouver Island basins. Light snow cover is general in these areas.

In the lower elevations of central and southern interiors, day-time heating for March reduced the snow pack considerably. At higher elevations little of the winter's snow has melted.

California—The Department of Water Resources reports the water supply conditions as of April 1, 1957, are below average in all of the state except the extreme northern portion of Sacramento River. Seasonal precipitation is generally below normal even with February and March precipitation above normal in the north.

Snow pack in the Cascade and Sierra-Nevada Mountains still is significantly below April 1 expectancy. Effective snow line elevation varies from 5,000 ft on the Yuba to 8,000 ft on the Kern River. During the first six months of the 1956-57 water year, runoff was below average in most areas of the state. However, in northern areas, near or above average runoff occurred during February and March in most major rivers. Water stored on April 1 in California reservoirs is 60% of capacity, or 115% of average for April 1. Carry over from the previous water year is responsible for high storage.

Water supply forecasts prepared by the Department of Water Resources show snow melt runoff for Cascade and Sierra-Nevada Mountains considerably below average. It varies from 33% on the Tule River in the south to 89% on the Sacramento River in the north. Late season water shortages may occur where carry-over storage is inadequate.



Reservoir Storage as of April 1, 1957

Explanation: (a) Most state averages for reported reservoirs are for a 15-year period (1938-52) but in a few cases reservoirs with shorter records have been included; (b) does not include Lake Monticello, Pine Flat or Folsom reservoirs (combined capacity 2,572,000); April 1, 1957, combined storage 1,160,000 acre-ft; (c) does not include John Martin reservoir on the Arkansas River (capacity 655,000 acre-ft) April 1, 1957, storage 3,800 acre-ft, or Granby, Horsetooth, and Carter Lake on the Colorado-Big Thompson project (combined usable capacity 723,000 acre-ft) April 1, 1957, combined storage 288,000 acre-ft; (d) Cedar Bluffs reservoir only; (e) does not include Fort Peck reservoir (capacity 18,800,000 acre-ft), April 1, 1957, storage 5,627,000 acre-ft, or Canyon Ferry, Tiber, Flathead, and Hungry Horse reservoirs (combined capacity 8,650,000 acre-ft), April 1, 1957, combined storage 4,450,000 acre-ft; (f) does not include Lake Mead (capacity 27,217,000 acre-ft), April 1, 1957, storage 11,502,000 acre-ft or other Colorado River reservoirs below Lake Mead; (g) W. C. Austin reservoir (new in 1945); (h) Red Bluff reservoir on the Pecos River; (j) irrigation reservoirs only, does not include Franklin D. Roosevelt Lake or Grand Coulee equalizer (combined capacity 5,834,000 acre-ft), April 1, 1957, storage 2,613,000 acre-ft; (k) does not include Boysen reservoir (capacity 560,000 acre-ft), April 1, 1957, storage 193,000 acre-ft, or Palisades reservoir (capacity 1,202,000 acre-ft, April 1, 1957, storage 308,000 acre-ft

Colorado—Snowfall is above normal in the mountains and water supplies should be adequate for most areas of the western slope. Limited shortages are expected on the South Platte, Arkansas and Rio Grande with rather severe shortages in the lower reaches of the Platte and Arkansas Rivers. Reservoir storage is low, but with spring rainfall some opportunity will be provided for partial replacement. The outlook is the best since 1952, but shortages will occur in the heavier demand areas. Soil moisture conditions are good on the irrigated areas of the western slope. As a result of heavy April snows, soil moisture conditions on the east slope are fair to good.

Idaho—Seasonal snow pack in the Idaho mountains varies from slightly above normal in the north to a little less than normal in the south. The main stem of the Snake River is above normal with excellent carry-over storage. There will be greater use of this storage because of the additional supply in the new Palisades reservoirs. The Kootenai River has the first near normal snow pack for several years. April storms could raise the streamflow considerably above normal.

Southern tributaries of the Snake River have had excellent winter flows. The water supply outlook is good where there is storage but late season shortages may occur where there is none.

Because of February rains, soil moisture conditions are above normal at high and low elevations. The mountain watershed soils are primed to yield maximum runoff.

Montana—The April 1 water supply outlook in the Missouri basin is generally good and slightly better than reported on March 1. In the Yellowstone basin the outlook is close to normal at the headwaters, but dwindles to about 86% of normal at Sidney. The Columbia basin outlook in Montana is generally good on the Flathead but only fair along the Clark Fork to the junction of the Flathead. Recent storms have not materially improved the water supply outlook.

Irrigation reservoir storage is 98% of normal and all reservoirs should fill with the spring runoff.

Nevada—Runoff on the Owyhee River and Humboldt River ranges from 75 to 87% of normal. Eastern Nevada snow pack measured 65% of normal while the southern part reported at 40% of normal.

Streams flowing into Nevada from the California Sierra Mountains will flow from 85% on the Little Truckee to 75% at Lake Tahoe. Moving south, the Carson River

watershed is being forecast at 70 to 80% and the Walker River watershed 50 to 70%.

In general, all users of reservoired water can expect adequate supplies. Irrigators depending on natural flow will experience late season shortages.

New Mexico — The flow of the Rio Grande through New Mexico will be more than for any year since 1952. Inflow to the Middle Rio Grande Valley will be about 75% of normal, and to Elephant Butte about 50%.

Continued severe shortage of surface water is almost certain for the Middle Rio Grande and southern New Mexico area. Use of groundwater will again be necessary at about the same rate. Storage is less than 10% of normal on the New Mexico section of the Rio Grande. The water supply outlook for the Carlsbad and Tucumcari projects is poor, principally due to lack of reservoir storage and drought in irrigated areas.

Oregon — Deficient irrigation water supplies are anticipated only in portions of the Crooked River basin and in some of the small watersheds which head below the mountain snow zone. Most irrigation reservoirs are filled or can be filled in the next few weeks. Mountain and valley soils are wet. Water content of snow increased more than normal during March. Mountain soils are not frozen.

Over two-thirds of Oregon's 20 large irrigation reservoirs are filled to capacity. None are less than 85% except McKay which is 70% of capacity. Storage in these reservoirs is 134% of the 1938-52 average.

An adequate supply of irrigation water is foreseen for much of Oregon. Important irrigated areas for which poor to fair water supplies are foreseen this season are as follows: Burnt River above Unity reservoir; Grande Ronde above La-Grande; McKay, Birch, Butter, and Willow Creeks in Umatilla and Morrow counties; Crooked River basin except for Ochoco Creek; Cow Creek on the South Umpqua; Applegate and Illinois Rivers in Rogue basin and many low-elevation tributaries of the Rogue; Silver Lake, Chewaucan, and Warner Lake basins; and the Silvies River area.

Texas—The irrigated area of west Texas along the Rio Grande will experience a continued severe shortage of water. Low storage in Elephant Butte and about one-half normal inflow will again limit water supplies to about one-third of normal. The outlook for the irrigated area below Red Bluff reservoir on the Pecos is poor. Storage is only about 15% of that of a year ago.

Idaho snow surveyors get ready to make a snow measurement near Sun Valley

Utah — Water supplies for practically all areas in the central and northern part of the state are expected to be good. A few watersheds may yield 5 to 10% less than average, but the supply should still be adequate. Seriously short supplies are still expected in the southwest for users served by the Sevier and Virgin Rivers and the smaller streams originating in the same area. Although supplies for users served by the main Sevier River are expected to be poor, they will be fair to good for those served by the smaller tributaries below Piute reservoir. In the Uintah basin the supply outlook is good in the west but only fair in the east. Late season shortages can be expected on Ashley and Brush Creeks, and the Uintah and Whiterocks Rivers.

Washington—Streamflow from snow packs will vary from 88 to 108% of normal. Irrigation reservoirs contain about 10% more than last year. Mountain soils are wet. Streamflow will be much less than a year ago, but the total supply will meet all irrigation demands. Storage in power reservoirs is generally less than normal but these reservoirs will fill during snow melt.

Wyoming — Except for the main stem of North Platte in southeastern Wyoming and the Snake River in the northwest, streamflow will be less than normal in 1957. Adequate supplies will be available in the Snake River and the Green River and its tributaries. Some shortage may be expected in smaller Wind River tributaries in the Big Horn basin. Unless summer rainfall is above normal, shortages will occur east of the Big Horn Mountains.

The irrigated area served directly by the North Platte should have an adequate supply if it receives average or better summer rainfall. As of April 1 soil moisture conditions were only fair. The Wheatland area on the Laramie River will not have an adequate supply. Streamflow will be slightly less than normal. There is no storage water available.

PCEA engineering and operating men learn how . . .

Computers Will Make Engineers

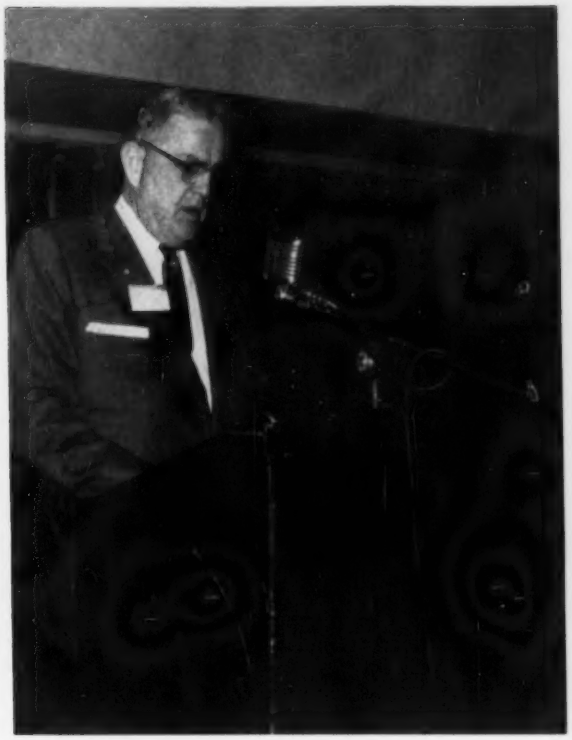
An IBM 650 sat quietly in the corner of the assembly hall all through the two-day session of the Engineering and Operation Sections of the Pacific Coast Electrical Assn. It was shortly before 5 o'clock Friday afternoon, the last day of the Los Angeles meeting, when F. J. Maginniss of the General Electric Co. submitted the problem to the machine. In a matter of seconds, the problem was solved and answers were being printed—answers that would have taken tedious months of engineering time by hand methods.

There were lots of reactions about the outstanding performance put on by the computor—all of them good. Management could see in the machine the ability to multiply shrinking engineering manpower. From the individual's viewpoint, there was considerable feeling that today's high-power computing machines would upgrade the professional status of the engineer, free him of the drudgery of hand calculation and create the opportunity to do the kind of engineering that would increase his personal value in any engineering capacity.

J. H. Drake, who presided over the meeting, made an offhand comment that would seem to capsule the place of computing equipment in the utility business. He said: "While we were setting up the program, a general session on computers seemed to be a good idea. Like everyone else, I was interested in this field. Little did I know that before the meeting would take place, my job responsibilities would change and now I *have* to know how to use this equipment, it isn't a casual interest any longer."

W. J. Vitek, in starting the program, discussed the elements of the digital computer in terms familiar to the engineering group. In remarkably short time, he had created considerable savvy regarding the operation of a modern computer. Westinghouse's Dr. E. L. Harder characterized the past decade as being paced by a 10-1 increase per year in power of computing equipments. He pointed to the consequent reduction in the cost of computation and the greatly expanded range of problems that now can be handled both by analogue and digital machines. Arizona Public Service Co.'s F. M. Walker and V. Converti discussed the scope and type of problems that their company hoped to handle in its new computing center.

It would be difficult not to reflect back on the first general session and to appreciate the practical way that succeeding sessions handled some of the problems presented by keynote speakers. San Diego Gas & Electric's Ralph Phillips, discussing effective sales



Phillips
San Diego G&E

Chadwick
Edison

More Valuable

programs, suggested that sales promotion should be aimed toward improving load factor as a fast way to bolster a company's profit position. In addition to load factor oriented sales promotions, he suggested that incentive rates might be established to encourage customers to use off-peak devices.

Discussing the engineering and operating problems that must be solved to meet future system demands, W. L. Chadwick, Southern California Edison Co., directed attention to manpower, money, materials and future fuels as broad areas of challenge. He pointed to some interesting and specific apparatus problems, which challenge the industry, including lower cost of underground transmission and distribution, standardization of complete substations, proof testing of high-voltage breakers, new means of limiting short circuit currents and even taped start-up systems for steam stations. He concluded, "there is plenty of opportunity for men without fear of work."

J. K. Dillar, Westinghouse's manager of electric utility engineering, discussed the manufacturer's contributions in the areas of research, system study and education—all leading ultimately to more efficient operations and lower customer costs.

Cal Tech's Dr. Fred C. Lindvall brought the group up to date on the latest thinking of educators on the engineering manpower problem. He clearly defined the kind of engineer that present-day colleges were graduating and made some cogent suggestions on how to obtain and best use our engineering resources.

Working sessions of the conference included individual group discussions as well as joint meetings of groups having common problems or viewpoints. For example, the overhead transmission and distribution group met once with the engineering design and substation groups, again with the underground transmission and distribution group and still another time with the transportation group.

Overhead T & D

H. J. Schomberg, Sponsor

At the first joint meeting, three papers highlighted the effect of 40-mva and larger distribution stations on the design of primary distribution feeders. The upper spiral of costs for right-of-way, station sites and equipment are potent forces working against the use of smaller sized substations serving 4-kv feeders.

R. A. Moulthrop, Pacific Gas and Electric Co., pointed out that standard feeder circuits of about 7,500 kva are recommended with the larger capacity, 12 kv, substation and that economic considerations, not thermal or voltage limitations, should be the basis of selection for conductor sizes. Diversity between feeders allows the capacity of the latter to be about 110% that of the substation capacity. He also recommended the more costly underground getaways, because of safety and better appearance.

T. A. Bettersworth of the same company expanded on PG and E practice in connection with these large substations. The use of faster breakers and higher

Around table (clockwise starting from extreme left) R. F. Stuart, PG and E; Bill Boynter, Federal Pacific Electric; Chuck Sedam, PG and E; Bert Smith, PG and E; T. J. Bliss, Westinghouse; Tom Bettersworth, R. S. Bain, PG and E

momentary rated automatic sectionalizers was set forth as the best solution against burn-down protection. The practice of limiting 12-kv duty to 10,000 amp by splitting the bus is also in effect. The combination of these two can produce satisfactory service. Heavy-duty automatic sectionalizers coordinated with high-speed station breakers equipped for instantaneous relaying on heavy faults permit:

1. The provision of two reclosings to restore service following a momentary fault located anywhere on the feeder;

2. Automatic isolation of persistent faults enabling the breaker to restore service promptly to the remainder of the feeder;

3. High-speed clearing of heavy faults to prevent burn down.

The Southern California Edison Co., according to M. R. Mosquini, is undertaking studies to clarify the use of automatic sectionalizers and reclosers also. In discussing the problems of regulation in modern distribution circuits, Mosquini described his company's practice of adjusting the 66-kv system to compensate for some regulation. In addition, the installation of 20 to 30% of the system peak kva in fixed and switched capacitors has been found to improve the regulation as well as providing additional power carrying capacity for the system.

The joint meeting of the underground and overhead distribution groups centered around the advantages accruing from cooperative planning. The different aspects of this problem were discussed by four panelists, E. A. Gates of California Electric Power, L. S. Bohlman of Arizona PS, Jack R. Rice of Sierra Pacific and John Koopman of San Diego G&E. They commented on the current trend toward laying out subdivisions in patterns other than the rectangular, which emphasizes the need for closer liaison with planning officials, architects, contractors and other interested parties in the early phases of the development of a project. It is also desirable to receive a print of a preliminary or tentative plan of a new subdivision at least 20 days in advance of its consideration for approval. This generally allows sufficient time to review the layout, to determine the best method of serving the area and plan for joint construction with other utilities. The ideal time to secure necessary easements, according to the panel, is while the tract is still in its tentative stages, since it is easier to work with the original property owner rather than with many individual property owners later on after the tract has been subdivided.

All parties concerned with tract planning should be well informed as to utility requirements for easements, particularly involving width, continuity and alignments of them. The trend toward rear property line easements for alley construction often makes it necessary to obtain easements along the sides of certain lots in order to provide for midblock street lights or for ingress and egress. Utilities must be continually alert to prevent the unsightliness that comes from misalignment of easements, the extra cost of construction required by the need for excessive guying and the necessity of considering the utility requirements in abutting or adjoining tracts. The ability to provide for means of getting from one tract into an abutting tract frequently will avoid the necessity of building lines from two directions.

Also cited as important factors were building lines, structure locations and reservations, all of which should be included as a matter of tract record. This will facilitate the layout of pole lines, particularly in deep-lot subdivisions. Reservations of easements on subdivision tracts prohibit the erection of permanent structures on the easements necessary to supply utility facilities.

The various phases of tension stringing of conductors were discussed by E. M. Foster, San Diego G&E, Howard Jandt, Southern California Edison, and P. C. Oldershaw, PG and E. The interest in the subject apparently has been created by the growing need to increase conductor size on older circuits with a minimum of cost and outage time.

Mechanically, the general practice appears to be the

Roberts
Allis-Chalmers

Drake
Edison

Mautz
PG and E

Mack
San Diego G&E

McCabe
Sierra Pacific

Schomberg
Calectric

Palmrose
Edison

Morris
Westinghouse

Croft
Square D

Canady
Edison

Blankenburg
Edison

Bausch
Bechtel

Franklin
Arizona PS

Engel
Allis-Chalmers

use of Kellem's grips on the end of the conductor to be pulled in and the use of Preformed splicing eyes on the end of the old conductor, the latter being less likely to loosen as it travels backward through the sagging blocks. The Southern California Edison Co. also uses a Preformed splice, which replaces the pressed-sleeve type before the reeling operation commences.

While direct reeling under tension is a possible for smaller circuits, the discussion brought out the fact that, when reconductoring with sizes larger than 666,-666 ACSR, the use of special bull wheel tension pullers is essential. On recent reconductoring jobs in both northern and southern California, tensions of between 3,000 and 4,000 lb were maintained during the operation. Lengths up to 6,000 ft were pulled, although on one job, the controlling length was 3,850 ft, the amount of conductor on a single reel.

Multiconductor pulling has proved to be very economical. On a 20-mile circuit, the San Diego company estimated that a 30% saving of labor cost was effected through the use of the tension stringer, three-wire puller and other time-saving methods.

Probably the most controversial part of the tension-stringing operation is the type of takeup reels used for re-reeling the old conductor that is being pulled off. Each company apparently has experimented with various types of single and gang-operated reels different from the power takeoff on trucks. The de luxe arrangement is the Pengo tension stringer with a takeup reel driven by the bull wheel power unit and synchronized through a slip clutch.

Another controversial point appears to be the economic aspects of guard structures during tension stringing. Jandt observed that the use of guard structures is entirely dependent upon the size of conductor, the spacing of poles or towers, the type of crossings and the area being traversed. Heretofore the stringing of calol-filled or greased ACSR conductor has necessitated sufficient guard structures to keep the conductor from picking up dirt and from coming in contact with structures, lines or similar works during the stringing operation. While tension stringing can eliminate a

Jung
Edison

highly populated areas, certain guard structures apparently need to be strengthened, because of the strong whip that could be developed by the conductor under tension, if a break should develop in the pulling sock or in the cable itself.

In other papers at the overhead T&D group, Jon Ruhlman of Preformed Line Products Co. described the conductor vibration research that is going on in that company's laboratory. His paper is available in printed brochure form on request to the company.

Economical and technical considerations concerning the heat pump and air conditioning loads were discussed by H. E. Campbell and Paul F. O'Neill of General Electric. Their conclusions were that modern distribution systems can be expanded to handle much larger loads in residential areas and that single-phase motor units up to 5 hp capacity not only can be utilized satisfactorily but probably will provide savings for the utility.

Substation Group

C. D. Mack, Sponsor

A panel discussion on the subject of minimizing errors in operating and maintaining substations pointed up the need for continuous training and supervision in this area of employee education. Speakers R. F. Stuart, PG and E. W. A. Weldav, Southern California Edison, and Fred Neimeyer, California Electric Power, reported on the experience of their respective companies in a program to reduce the frequency and cost of switching mistakes. All agreed that analysis of the type and cause of error was essential and each company publishes reports on errors in internal publications to operating personnel.

Harsh disciplinarian action apparently did not improve the record as much as training and education and full publicity. Each company also reported that it was in routine, rather than emergency, switching that mistakes more often happened.

Mosquini
Edison

One company uses a team of an operator and a checker on all possible switching operations—a scheme which not only gets a double verification on the steps to be taken but likewise provides additional training for personnel. Basic steps for improved performance in the future begins with the selection and training of new operating personnel and better communications between the dispatcher and operators so that the latter will know both what to do and what is to be accomplished by a given switching sequence.

E. C. Neff, Southern California Edison, described the modern trends in installing control cables in substations resulting from an improved technology in the manufacture of the product. Because of improved protective sheaths now available, duct installations are no longer necessary. Cables can be laid in cable trenches or tunnels, supported on hooks or with trays, and can be spliced with assurance that the joint will have the equivalent insulation value and mechanical strength of the original cable.

The elimination of duct banks, particularly of those installed for ultimate station development, provides considerable economies. Cable trenches and tunnels also permit easy access to any given cable without disturbing other circuits or involving expensive replacement procedures.

Substation costs can be reduced, according to Keith Fullenwider, Bechtel Corp. He told the substation group that careful engineering, standardization, the adoption of improved construction materials and good supervision can reduce the installed costs. While the cost of equipment is fixed by future requirements and future growth, there are areas where cost can be controlled. These include certain phases of the basic engineering, the use of labor to the best of advantage by proper planning and the selection of construction materials, particularly on such items as steel.

Two excellent discussions described the current trend in beautifying and landscaping residential substations. J. L. Cattolica, PG and E, and C. L. Ryan, Southern Nevada Power, showed excellent examples of exterior substation designs that harmonized well with their immediate surroundings. Attractive concealment, by whatever method, is essential to win public acceptance and promote community good will.

Insofar as landscaping is concerned, it was recommended that plant selection be left to the local nurseryman, who knows the area and can provide attractive looking shrubs, plants and vines that will be hardy and at the same time require little maintenance. PG

Mack
San Diego G&E

Bettersworth
PG and E

and E retains local nurserymen to keep premises presentable.

Engineering Design

D. R. Hoopes, Sponsor

Economic studies, which are a forecast of the future, are another tool for the use of management in arriving at sound decisions. William M. Marriott, Southern California Edison, described methods used in providing management with the data on which to make its decisions. Such studies, he said, should include estimates of all components of cost including income tax. Even though some components may be stable as regards to annual cost, others may vary and can be arrived at only by an estimate of trends and by rationalization.

In the southwestern area, irrigation pumping has always provided a substantial summer load. The climate, for the same reason that irrigation is needed, encourages widespread use of air conditioning. The impact of these loads on distribution system designs was discussed by H. E. Jung, Southern California Edison, and M. M. Bridgwater, Arizona PS. Jung reported on studies made in several typical residential areas in the hot regions. As a result, Southern California Edison engineers conclude that there is practically no diversity on home cooling loads and that air conditioning will produce a demand of about 2 kva per house in groups of five or more homes.

Operating practices that have to be changed to accommodate the high summer peak were described by Bridgwater. In addition to having to increase distribution transformer capacity and other components of the distribution system, it has been necessary to adjust maintenance programs to make peaking power available during the summer, together with the scheduling of purchased power for the peaking period. Substation transformers are given routine maintenance only during the light winter loading period and the regulation on the distribution system has been augmented by varying the 66-kv system and by the application of fixed and switch capacitors.

He suggested that the main problem is not to develop procedures to handle the peak load in summertime but to develop new loads that will improve the annual load factor and thus avoid the operating problems incident to high summer demands.

In a joint session with the hydro generation, steam generation and system operation groups, the problems of economic dispatch were presented and discussed by three representatives of electrical manufacturers. Automatic economic dispatch computers are designed to provide a system load with a minimum fuel cost on an incremental basis. T. W. Hissey, Leeds & Northrup Co., reported that such a computer can follow an incremental cost curve with an accuracy greater than the curve itself. He suggested that a continuing study be made to determine the economic value and savings possible through the use of such devices.

T. J. Bliss, Westinghouse Electric Corp., told of one such computer designed jointly by his company and the West Penn Electric Co., which proportions automatically any given total load on an equal incremental basis among 11 steam plants and one hydro station. On the American Gas & Electric system, the use of a manual penalty factor computer for transmission line losses resulted in accrued savings of about $50,000 per 1,000,000 kw of installed capacity. K. N. Burnett, General Electric Co., who described this installation, stated that manually operated computers are comparatively inexpensive and can be expanded into automatic operation when desired.

System Operation

C. R. Canady, Sponsor

The use of calculators and computers was further discussed in the system operation group when H. Wood and C. E. Stein of Southern California Edison described the use of that company's a-c network calculator, which was installed in 1955. It has proved to be an invaluable tool in solving the complex network problems presented by a rapidly growing system.

The calculator is used to obtain load flows on the Edison's 220-kv system in each of 17 existing 66-kv service areas. These studies determine the adequacy of the existing transmission system, new substation facilities required to serve anticipated loads, the system reactive power requirements and methods for controlling the short-circuit duties. It has proved to be an excellent means of determining the electrical performance of present and planned electrical facilities during normal and emergency operating conditions.

Providing for the ultimate emergency, when load demands exceed generating capacity of the system, was the subject of a discussion by W. A. Davis, San Diego G&E. Even on the best designed system, it is possible that circumstances can cascade to the point where the temporary loss of sufficient generating capacity might

result in the complete system's shutdown, he said.

Normal supervisory control may well prove to be "too little and too late." To forestall such a situation, San Diego G&E has installed a simple system of shedding large blocks of preselected load. This is done by the load dispatcher at a central point and the load drop system is completely independent of supervisory control and a-c sources. While block load shedding is not advocated as a substitute for proper design or operation, it is a backup protection against a possible system-wide outage.

George H. Groh, executive vice-president, Arizona Public Service Co., told of the cooperative and partnership plans through which the interconnected electrical systems in Arizona have been evolved. The first joint venture of building power plants in Arizona was made in 1929 when the Salt River Valley Users Assn. and the Arizona power company built a 15,000-kw steam plant. These same policies have continued right down through to the present, the latest joint venture being the construction of the Yuma-Axis steam plant described on page 85 of this issue.

Hydro Generation

E. W. Palmrose, Sponsor

Many old hydro stations can be modernized to increase output and efficiency. This was the conclusion reached by George E. Hochwalt Jr., S. Morgan Smith Co., who described his company's new high head cavitation test stand and some of the studies that have been completed thereon.

Factors that made possible increased outputs from older stations include closer regulation of river flowage, space and setting limitations that may be made in the light of more recent knowledge and the possibility of making adequate predetermination from homologous models under test conditions. The latter developments provide reliable data from which modernization economies can be evaluated.

P. B. Dawson Jr., Pelton Division, Baldwin-Lima-Hamilton Corp., told the meeting of a rapid acceptance being accorded the vertical-type impulse hydraulic turbine. Reason for this include the higher efficiency possible from that design and their ability to operate at higher unit specific speed with resulting economies.

Vertical impulse units also lend themselves to satisfactory supervisory control, have relatively low runaway speeds and can be set relatively low, which increases available head. Field testing is also being conducted on the use of compressed air to create tailrace depression, which will still further improve the latter characteristic.

In another presentation, the economics of renewal of seal rings on hydraulic turbines was reviewed. J. L. de Roco, Southern California Edison, prefaced his remarks by stating that water loss through worn seal rings was more important in high head plants with nominal storage than in plants operating with an abundant water supply. To the former plants, water spilled through poor seal ring clearance is a definite economic loss that can be translated into a paying program to renew the seals. When seal ring renewal is done as a part of the general turbine overhaul, the job costs between $1,400 and $2,500 and will average seven to eight days outage time on units in the 35,000-kw class.

M. L. Dickinson, Bechtel Corp., told the meeting that the hydraulic properties, the energy dissipating characteristics, the low cost and low maintenance expense of the fixed cone dispersion valve made it attractive as an outlet control valve in many installations. It is particularly valuable in areas where soils are easily eroded because it dissipates energy over a wide area but may present problems because of freezing spray. This difficulty can be eliminated by proper design of structures that will contain the spray.

Underground T & D

R. C. Blankenburg, Sponsor

Two Pacific Gas and Electric Co. engineers discussed various aspects of underground systems. E. E. Neher stated that the high cost of underground system work makes necessary continuous study to increase the efficiency of the crews. New methods and new tools play an important role in this connection. For example, PG and E now uses radio-equipped trucks for service and maintenance operations on the underground system; it has found the "mechanical mouse" (a device for fishing ducts) to be a great time saver; it has developed a new type of lightweight shallow manhole casting and it installs automatic electric sump pumps at important load and switching locations on the underground system.

New methods for speeding underground work include draining and filling 4-kv oil-fuse cutouts outside the manhole while the circuit and equipment is energized; the freezing of low-pressure gas cables to determine that section of the cable which is leaking nitrogen gas; nitrogen pressure testing of transformers, network protectors, splices, junction boxes and switches to catch leaks before they are installed and the mounting of a special nitrogen gas tank inside the cable reel to maintain gas pressure on a faulty cable being removed from the duct.

Fred Milam described the steps in the development of secondary network systems with particular reference to serving higher load densities on an existing system. For example, in the San Francisco financial district, the load density has grown to approximately 25 w per sq ft of land density.

He described methods whereby nearly 15,000 kva capacity has been added to the network area with practically no increase in 12-kv cables. This was done by adding short 12-kv feeders from the station to nearby manholes and cutting over parts of the load of existing feeders to the new circuit. In this way, four overload feeders were transformed into six with still a considerable amount of available capacity before they too become overloaded.

Higher load densities and a scarcity of station sites are resulting in the use of longer higher capacity underground transmission circuits requiring higher voltage cables. This in turn has led to the acceptance of the pipe-type cable systems for such service. C. W. Callow, Okonite Co., who introduced this discussion, concluded that, because such systems are capable of transmitting large blocks of power, their use will undoubtedly become more widespread.

Edward E. McIlveen of the same company described recent improvements and modifications in polyethylene. New processes and new techniques make possible the production of highly specialized polyethylene products on a scale that still leaves wide areas for greatly improved insulations.

The conventional polyethylene insulation has had an excellent service record, is attractive economically, but improved splicing methods can still be worked out to an advantage.

Paul Rist, Arizona Public Service Co., told the meeting that the need for the use of overhead transformers

in underground vaults is becoming more urgent as time passes by and the pressure for low-cost underground residential distribution systems increases. He suggested that distribution engineers exercise ingenuity to provide an answer to the problem of cable termination on overhead-type transformers, which are used in vaults or manholes where the possibility of submergence is always present. His remarks were supplemented by a description by J. B. Bowen, San Diego G&E., of a tract design using a transformer per house in a low-cost underground installation.

Steam Generation

F. F. Mautz, Sponsor

Back in 1955, a program was started at El Segundo steam station of the Southern California Edison Co. to investigate the composition of flue gases and to determine means for minimizing or eliminating any components deemed to be possible air contaminants. This program, described by Bechtel's George D. Gideon, included the building of a pilot-size electrostatic precipitator, which operated on flue gas drawn from the inlet gas duct at the air preheater. Tests indicated that the conventional methods of determining precipitator efficiency were unsatisfactory for the extremely fine particles encountered in flue gases from stations burning residual fuel oil. Other tests indicated the satisfactory efficiency determinations could be made using filter paper staining techniques and that the pilot unit had an efficiency of approximately 90% in the removal of the particulate matter. The program is continuing with the objectives of devising an accurate method of determining SO_3 concentration in flue gases and determining methods for removal of the oxides of sulphur and nitrogen.

D. V. Kelly, PG and E., described the design of PG and E's Humboldt Bay steam plant, which is capable of picking up from minimum to nearly full load in three seconds. The station normally operates almost on a "stand-by" basis as the basic source of power for the Humboldt Bay region is supplied by 110-kv transmission lines from the Sacramento Valley.

The quick pickup characteristics of the plant are provided by an oversize boiler drum and steam-heated cylinder bolting on the turbine that minimizes stresses during rapid load changes.

The utilization of the exhaust gases from a gas turbine was discussed by O. E. Dowies, Arizona PS. There are a number of methods in which the exhaust heat from a gas turbine can be combined economically with the conventional thermal cycle, all leading to lower over-all heat rates for the combination. All, also, are practical from an operating standpoint but cost studies must be made in each installation to determine if the combination is economically justified.

In another paper designed to describe the cost-saving design features of the San Bernardino power plant of the California Electric Power Co., Fred Bagwell told the meeting that contributing features included short gas ducts, bolted structural steel, elimination of induced-draft fans, and a multichambered, vertical water storage tank.

Transportation

R. L. Franklin, Sponsor

A wide variety of pertinent subjects was included on the program of the transportation group, including panel discussions on 12-v electrical systems, the experience with hydraulic equipment and a slide presentation on new types of automotive equipment.

Jung Edison — **Hoopes** So. Nevada Power — **Bridgwater** Arizona PS

Conventional driver training programs are not capable of producing operators for the many diverse types of vehicles encountered in the utility operation, according to R. M. Middleton, San Diego G&E. Consequently, most utilities have to develop their own driver training systems and the success of these depend, first, upon careful screening and selection of prospective operators. Selectees must receive constant exposure to the various aspects of the training program and their preliminary routine work should contribute in some measure to developing abilities as a vehicle operator. Such programs will produce best results if some attempt is made to match the employee's natural aptitude to the work to be performed.

D. K. Madison, San Diego G&E, described the maintenance procedure utilized by his company to insure safe and efficient operation of vehicular equipment with special attention to hydraulic devices. The latter have been widely adopted in today's labor-saving economy.

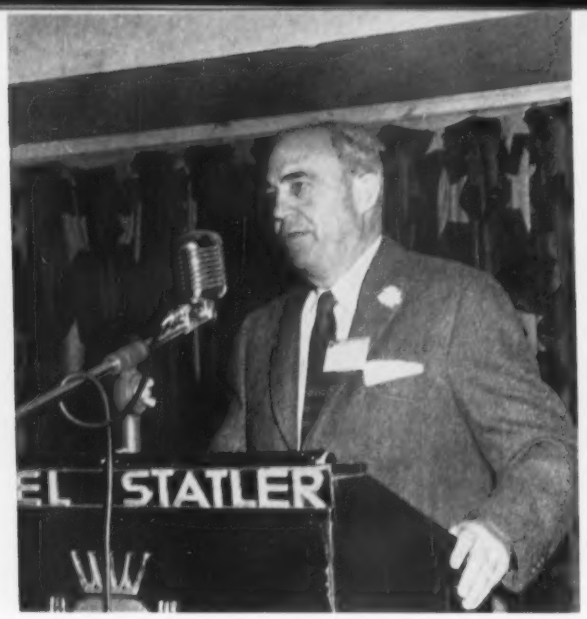
In addition to the conventional inspection of engine and chassis components, he recommended the use of materials testing methods to check the soundness of welds and highly stressed parts. Test methods includes the use of radiograph, X-ray, magnetic particle inspection and fluorescent penetrants under black light.

Meter Group

J. L. Bartholomew, Sponsor

Committees working on standardized service entrance requirements reported progress during the past year. In the southern California area, E. B. Kipp of San Diego G&E stated that 1956 saw the development and adoption of a standardized safety socket meter box. This one basic enclosure is suitable for metering single-phase, three-and four-wire single-phase services. Because of the appreciable space saving and cost, the new meter socket box has met with enthusiastic approval. Problems that are being pursued further are the standardization of terminal positions on the bus duct service head and the development of meter socket terminals suitable for the use of aluminum conductor.

In northern California, J. L. Bartholomew, PG and E, told the meeting that committee activities resulted in the elimination of the installation of automatic circuit closing devices, particularly those operated by the side movement of the socket jaw. Other accomplishments included the acceptance of certain basic ideas with respect to metering cubicles in such boards as the 601-15,000-v class and the development of basic ideas with regard to bus configuration in the 0-600-v



Maytham
Westinghouse

Lindvall
Cal Tech

switchboard, when multiple-use bus is used. There has also been developed an acceptable type of 200-amp meter sockets with manual circuit closure devices, which will be used for commercial and industrial installations.

A. D. Irion, Southern California Edison, reported that the EEI meter and service committee had recommended standards for both single-phase and poly-phase watt-hour meters. In general, these standards will include such factors as dimensions, terminal arrangements, method of rating, register constants and minimum name-plate information.

Another report that will be available in the near future is entitled "Symbols for Meter Diagrams," which is a revision of the EEI publication C-10, issued in 1935. This will serve as a standard for metermen. A revision of a 1945 booklet, "Safety Practices for Metermen," is now available at a nominal cost.

The question of acceptance tests on new meters was discussed by Hugo Schoener, Sierra Pacific Power Co. After several methods of testing, his company has adopted the practice of giving a new meter a light-load test only before sending it to the field. The other tests ranged all the way from sending meters out without testing to a complete full-load, light-load and power-factor test. The method finally adopted appears to provide minimum expense and high satisfaction, both from the standpoint of the customer and the company.

Dorr Kimball, Southern California Edison, discussed the difficulty of maintaining a correct kilowatt-hour in the laboratory, meter shop and the field. He characterized the meter testing operation as a "chain of standardization" in which an adequate ratio must be maintained between successive standards. The accuracy needed at each step of the chain will be determined by the length of the chain, the needed accuracy ratio and the accuracy desired in the final result, which is the billing installation. Accuracy of the billing installation will be largely determined by economic considerations, which economically justify the accuracy ratio in each higher step of meter checking from the field to the laboratory standards. Continuous verification and repeated cross checking are necessary to reduce over-all errors to a satisfactory point of toleration.

W. D. Shattuck, PG and E, discussed the adoption of an extended range, 200-amp single-phase meter. While such a meter would carry all of the current that the main switch will carry, he pointed out that the questions of what current points to use for testing, what constitutes "reasonable" starting watts and what full load disk speed would be optimum, have as yet to be answered.

Communications

W. L. McCabe, Sponsor

R. J. McKnight, Arizona PS, described the extensive microwave system that has been installed by his company and has given excellent service. This system was described in the October 1956 issue of ELECTRICAL WEST, p 93. At the other end of the scale, L. R. King, California Electric Power, told about a microwave system only five miles long, which was designed primarily to provide communication channels for phase comparison relays at the Highgrove steam plant at San Bernardino. On this system, the major design problem was the selection of stand-by and alarm features to insure maximum reliability. Except for carrying local instructions, there has been no propagation problem.

Adapting the dial telephone to microwave and carrier circuits sometimes imposes certain problems. K. E. Dueker, Southern California Edison, described the necessity for replacing the conventional physical circuit by its equivalent derived circuit of microwave and carrier systems. The object is to provide the equivalent circuit that will transmit electrical energy in the form of direct current at either polarity and alternating current forms simultaneously. He recommended that the methods used to synthesize the physical circuits by means of tones, carrier presence or carrier shift should be understood by the persons installing and maintaining dial telephone systems operating on derived circuits.

L. E. Ludekens, Southern California Edison, reported on the current status of the regulatory climate as controlled by the Federal Communications Commission. Split channel operations in the mobile band width are under consideration and there are indications that definite assignments can be made in the regions above 890 mc, which heretofore have been considered developmental.

Labor-management committee of the San Francisco Bay area which has been working on an area-wide wage and labor agreement, a part of which is a joint industry board. Seated: Ernest Kramm, Northern California Chapter, NECA, manager; Tom Ryan, IBEW Local 302, Richmond, business manager; W. H. Diederichsen, Local 617 business manager, San Mateo; Emil Weber, president, San Francisco Electrical Contractors Assn.; Everett Marshall, president, Peninsula Electrical Contractors Assn. Standing: C. Fiegel, business manager, Vallejo Local 180; Irving Butcher, San Jose, representing Santa Clara-San Benito Chapter, NECA; Henry Gunderson, assistant business manager, San Jose Local 332; Charles Foehn, Local 6 business manager; Andy Maser, Walnut Creek, representing Northern California Chapter, NECA; W. J. Varley, executive manager, San Francisco and Peninsula Electrical Contractors associations; George Harter, executive manager, Santa Clara-San Benito Chapter, NECA. National IBEW and NECA officials were consulted

What's a Joint Industry Board?

There is a lot of talk among contractor associations and unions about joint industry boards. Just what are they and what are they supposed to do? This is a question many contractors are asking.

The subject is particularly pertinent since it is being made an important part of a proposed area-wide labor agreement or at least a uniform wage agreement in the San Francisco Bay region. Likewise, it is being discussed seriously in the Utah and Idaho area. Arizona already has one such board. An agreement to have one in Fresno was turned down by International Brotherhood of Electrical Workers. And it was one of the chief items of discussion on the agenda of the National Electrical Contractors Assn. chapter managers institute held in Cincinnati last month.

So important did the San Francisco Bay area labor-management committee of local unions and NECA chapters consider the matter that it sent a delegation to Washington, D. C., to confer with IBEW and NECA officials. The delegation consisted of W. J. Varley, manager, San Francisco Electrical Contractors Assn. and Peninsula Electrical Contractors Assn.; George Harter, manager, Santa Clara-San Benito Chapter, NECA, representing management; Charles J. Foehn, business manager, IBEW Local No. 6; W. H. Diederichsen, manager of Local 617; and Tom Ryan, business manager, Local 302. It met with Gordon Freeman, president of IBEW, and Oscar Harbak, vice-president of District 9.

Evidently agreement was reached for approval of a joint industry board for it was so announced at a subsequent meeting of the San Francisco association. Its importance was made greater by the tentative agreement that had been reached among most of the unions and the NECA chapters in the Bay area for a uniform package of wage increase, health and welfare benefit increase, vacation and joint electrical industry board fund effective in July. The union demand for a total increase to match the plumbers, all in one lump, had been compromised on a stepped scale to include these items.

In the new wage scale, 5c an hour would be paid by the contractors into the joint industry fund. Of this 1c per hour would be earmarked for use solely for apprenticeship training. Since the scale would apply to all who employ IBEW electricians this apprenticeship program, hitherto financed by NECA contractors only, would receive proportionate support from nonmembers.

In fact, the whole idea of a joint electrical industry board is that programs of training, promotion, codes, industrial relations and public relations which benefit all contractors and union members will be supported by all rather than by NECA alone.

To acquaint the members of the Santa Clara-San Benito Chapter of NECA with the purpose of such a board, George Harter, in the chapter bulletin, *The Outlet Box*, gave an

outline of the activities that the other chapters later reprinted and circulated to their members as well. It goes as follows:

In the near future, we will be hearing a lot about industry boards and the work they perform. Many people do not know what an industry board is, or how it operates.

An electrical industry board would be a group of representatives from labor and management who would have as their responsibilities the following (depending on the mutual program decided on):

Business promotion

1. Acquiring the volume of work presently being done by *others* than the members of the IBEW or electrical contractors such as (to name a few): (a) maintenance; (b) duct work—underground; (c) commercial and industrial TV; (d) construction work done by employees of individual concerns.

Public Relations

1. Acquaint the general public with the nature of the electrical contracting industry and its method of operation.

2. Sell the idea that the best way to have their work done is through the licensed electrical contractor and qualified electrician.

3. Inform them of the background, training obligations, responsibilities, guarantees and other pertinent data regarding the people in the industry and the consequent items of cost affecting the work accomplished so that the people will be more receptive to the price structures of work and so that our bill will be better understood and easier to collect.

Codes and other forms of industry legislation

1. The costs of promoting good codes should be shared by the industry so that the difficulties arising from lack of understanding and uniformities can be eliminated.

2. Code schools should be constantly available for the people who must use the codes in performance of their work. This is especially important where the work force is partially composed of traveling wiremen.

3. There are other types of legislation affecting the industry (such as licensing) along with other *nonpolitical* matters which affect the industry and should be handled.

Education

1. The most fertile field for increased efficiency lies in the better education of our apprentices who will, in the years ahead, form the hard core of our work force. Along with this program would be supervising, job management, and architectural and electrical blueprint reading education, along with journeyman refresher courses in the application of new techniques and materials.

Industrial relations

1. Convince the manufacturers, distributors and dealers that the electrical industry is their best customer, and work out a program for the mutual betterment.

Related problems

1. Checking permits to ascertain if any work is being done by other than IBEW men (and if so, what percentage); then recover this work by selling our industry.

2. Determine if anyone in the industry is violating the terms of the agreement to the disadvantage of any other person, and then attempt to correct the situation.

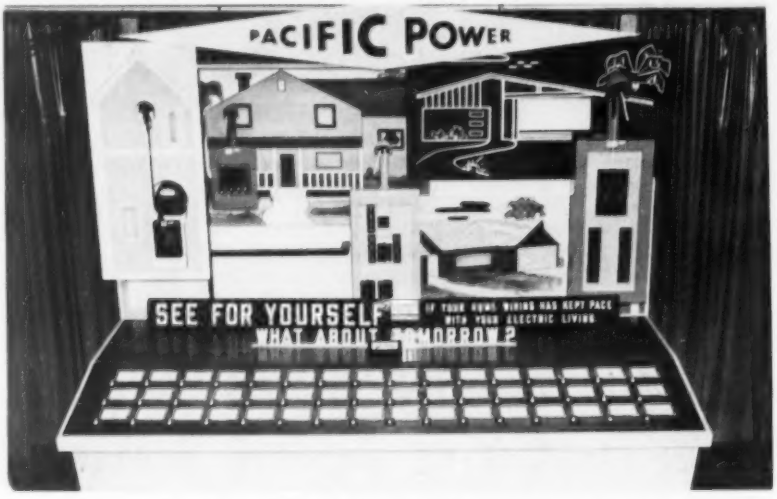
3. Encourage better plans and specifications.

4. Cooperate with other segments of the industry to eliminate, or reduce, common problems.

5. Cooperate with governmental and other agencies in the betterment of the industry.

6. Cooperate with groups seeking to improve or enlarge the work opportunities for electrical contractors and IBEW electricians.

7. And many, many others.



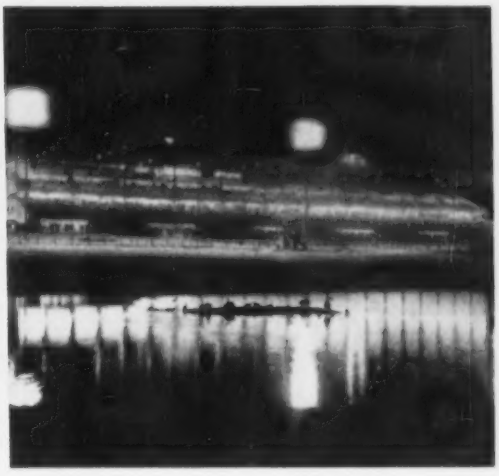
Low pressure selling is used in this "See for Yourself" lobby display of PP&L

To sell home wiring . . .

Finance for Results

The wiring-financing plan inaugurated May 1, 1956, by Pacific Power & Light is doing so well that the company will continue with it, although no special promotion is planned. During the period from the start, May 1, 1956, through Feb. 28 of this year, 933 contracts had been sold for a total of $167,089.64. Included were the financing and installation of 268 water heaters, for $2,852.36. The average contract was $182.84. The only promotion given was during the first three months of May, June and July. Since then there has been no advertising, yet the growth of the use of the plan has been steady month by month with an average from 85 to 90 contracts per month, one-third of which involve a water heater sale.

During April a series of dealer meetings was planned to present the wiring-financing program once more to dealers and to reach new ones in the field. Literature was given out and the whole idea was tied in with the Live Better . . . *Electrically* and Housepower programs. While the financing will not be advertised, the dealers and contractors are urged to tie in their own ads, mentioning wiring financing to close sales. Banks in the area have reported increased wiring loans in many cases, stimulated by the program. The company's limit of $350 diverts many loans to the banks.



SPECTATOR'S view and "bird's eye" view of the quarter-horse race area are shown in these photos of Centennial race track

Racetrack owners are hoping . . .

Light Will Turn Turnstiles

Colorado's latest racing craze, the quarter horse, has teamed up with a new $135,000 floodlighting system to provide a thrill a second for fans —and an extended season of 25 days at Centennial Race Track, nine miles south of Denver. Designed with an eye to the future, when night thoroughbred racing may be included in the program, the system capacity permits doubling the number of floodlighting units with no major changes required.

Track officials across the country—quick to admit that the administrative "win, place, or show" of their plant is being decided on the basis of sound business economics as much as traffic at the windows—are viewing Centennial's lighting experiment for quarter horses with considerable interest. Long concerned by the heavy investment required to support a racing season of a few short weeks, track administrators are now feeling the pinch of spiraling operating costs with little or no relief in sight. The approach developed at Centennial, supplementing thoroughbred racing with a separate quarter-horse meet under lights, may well be the answer, providing of course that the State Racing Commissions will approve the added schedule.

While several thoroughbred tracks occasionally offer a change-of-pace quarter-horse race, Centennial Track is the second in the nation where they run in an exclusive meet. A product of the plains states, the short, thick-legged quarter horse is noted for its lightning start and extraordinary speed in covering a distance of about a quarter mile. Since only the straightaway area of the track is used for the quarter-horse meet, fans can see every action-packed second from start to finish.

In fact, the main purpose of Centennial's floodlighting system is to provide a consistent and even distribution of light over the quarter-horse racing area. From the starting gate to the first curve, a light level of 20 f-c is maintained, with a finish line reading of 300 f-c. The floodlighting system further provides basic illumination of 5 f-c along the backstretch area of the track and 2 f-c along the tanbark trail leading from the stables, between two infield lakes, and to the paddock, allowing fans to view the colorful entrance of the horses. Service lighting of the parking lot, barn area and grandstand also is included in the system.

Design and layout were performed for the Rocky Mountain Quarter Racing Assn. by Glenn R. Fickel, with installation under the direction of Goorman's Inc., Englewood, Colo., contractor. Utility power is provided by the Colorado Central Power Co. to a 1,000-kva substation located near the first curve of the track. Here the 13.8-kv, three-phase, three-wire service is initially stepped down to a voltage of 4,160, then further reduced by three 333-kva transformers to 2,400 v. The 2,400-v service is then carried to a switch house located nearby where it is used to energize three three-phase disconnect switches controlling track lighting and two single-phase switches that control lights in a diesel generator house at the finish line and along the tanbark trail. Utility power is routed through 11 separate circuits, with adjacent lighting areas connected to a different branch, and circuits balanced between the three phases. This arrangement insures partial illumination over the entire track in the event of power failure in one phase.

Direct-burial primary cable, 5,000-v rating, carries service from the switch house to pole transformers. Three sizes of the heavy-wall neoprene jacket conductor are used, No. 4, No. 6, and No. 8, with from one to four conductors to each pole location. The pole transformers further reduce the line voltage to 220, providing a single-phase, 60-cycle service to the floodlights. Transformer capacities range from 10 kva to 25 kva, with four 2½% taps provided below 2,400 v on high tension.

ASSEMBLED pole, complete with transformers, floodlights, is positioned. Deep trench is answer to Colorado weather extremes

Service from the substation to the stable area is carried by overhead primary lines, with the 120/240-v primary underbuilt on the power company's poles.

Emergency Provisions

To offset complications that might arise through the failure of purchased power during a race, auxiliary service is provided by a diesel generator energizing a 225-kva, 2,400-v transformer, both housed in a small building behind the "tote" board. The three-phase, three-wire delta circuit is routed through two switches—one three phase, the other one phase—to power one-half of the floodlights along the first quarter-mile of the track, with service carried by No. 6 and No. 8 direct-burial primary cable. Auxiliary service also is provided through neoprene-jacketed, direct-burial secondary cable (600-v rating) to poles located along the tanbark trail.

The track is ringed by 29 poles, positioned at intervals ranging from slightly more than 100 ft in the starting gate area to over 200 ft in the backstretch. Six 80-ft Union Metal poles are used in the stretch area. The remaining poles varying in height from 40 ft to 80 ft, were manufactured by Tulito. Each of the poles along the straightaway area supports a bank of 24 luminaires on four crossarms, with two service platforms provided. The remaining poles support five to 18 floodlights each, on two or three crossarms. The pole assemblies, including floodlighting and transformers, were lifted into place by crane, then positioned and bolted to the concrete base pad.

The Centennial installation includes a total of 500 Crouse-Hinds FLA floodlights, grouped in rows of from four to eight, with illumination provided by 1,500-w general lighting service lamps. To obtain an even distribution of light as indicated by Crouse-Hinds spotting diagrams, the floodlights were preaimed, using vertical and horizontal quadrants supplied on the fixture for initial aiming. Aiming was checked and final adjustments made by using a peep sight and small frosted spot in the center of the cover glass. After dark, minor final adjustment was made using lightmeter readings as the criterion. Beam spread ranges from 20° to 80°. The hinged lamp head is swung away from the reflector during relamping or cleaning, to eliminate the need for reaiming floodlights during the course of normal maintenance.

The finish line light level of 300 f-c is attained by six 24-in. type DCE Crouse-Hinds searchlights located adjacent to the cameras on the roof of the grandstand, 60 ft above ground, each housing a 3,000-w, 32-v mogul bipost T32 aviation service lamp. Electrical service is provided by three 120/32 dry-type transformers, each with a capacity of 5 kva. Original plans also called for a bank of six backup lights located on the infield side of the finish line, but lightmeter tests showed that sufficient illumination was attained from the six searchlights aimed at 12-ft centers across the 80-ft finish line. Supplemental lighting in the grandstand and Paddock Club area is provided by 11 1,500-w floodlights.

Future Provisions

Future lighting needs at the double-duty Centennial Track were considered at every step of the installation. The heavy-duty underground cable safely can handle double the present load. Additional crossarms and floodlights can be added to presently installed poles to provide increased illumination along the backstretch area of the track. The 1,000-kva substation and 225 kva auxiliary service together have the capacity to double the number of floodlights with no major system changes required. Meanwhile, quarter-horse fans are looking forward to their second season this spring at what Centennial's General Manager Ivan Thomas calls "one of the best lighted tracks in the nation."

NINE assemblies provide 30 f-c for the quarter-horse area. Each has 24 lights

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Cooled down

Hoped-for upturn in building construction last month was slowed by many regional conditions in the West. Heavy storms in the Northwest and Rocky Mountain areas delayed things. In the lumber-producing areas, all business was feeling a depression from slowed down house construction last year. The Southwest, unaffected by these, had better prospects. Distributors, however, complained of slow pay and more contractor bankruptcies than normal seemed to be reported.

More sky ahead

Plans for lots of projects however are keeping architects' engineer offices busy. Most still complain of lack of manpower to turn out the volume of work. This should mean business by summer.

Relax credit

Home building should respond to new FHA down-payment relaxation. Continuing industrial expansion will sustain a demand for more housing for the influx of workers to man these industries.

Housepower hope

Home wiring modernization programs offer a market for small contractors hurt by the house building decline. Successful programs are being run in Phoenix and Portland. Another has started in Salt Lake City. One is contemplated in Boise. The Phoenix program is run by the Electrical Joint Industry Board with close cooperation both of Arizona Public Service and Salt River District. The Arizona delegation of Ernie Cannon, NECA contractor, Leo Sherman, Salt River District, and Les Waggoner, Arizona Public Service, presented results of the program both to the National Adequate Wiring Bureau conference and the NECA District 5 conference at Oklahoma City.

Meeting all over

April was crowded with too many meetings for coverage or even digestion this issue. Our June "Convention Reports" issue will endeavor to digest them all for you. IES met in Victoria, Los Angeles and Albuquerque. Inspector chapters had annual meetings throughout the West, attended by Everett Cogan, technical secretary, IAEI. EMEA of Southern California held a biennial Electrical Maintenance conference at University of Southern California. Other meetings of RMEL and NELPA were sprinkled in. All were packed with information of value to electrical contractors who, however, were not present in significant numbers. They were chasing down that delinquent account in order to meet the pay roll. The suppliers could wait.

For jet landing

First electronic flash approach system to aid pilots of high speed jet aircraft, at March Airforce Base, Calif., was commissioned March 14 by Major General A. J. Olds Jr., and B. K. Wickstrum, Sylvania vice-president. The system (to be described in a subsequent issue) consists of 23 Strobeacon condenser-discharge lights mounted upon a center line bar, flanked on each side by two white incandescent lamps. The flashes emit 30,000,000 candlepower in sequence, giving pilots what appears to be a moving line of lights down the landing strip.

Laws fail

Legislation fared rather poorly in the various states of the West, as final results became known. In Utah, the inspection bill still lay unsifted from the sifting committee, as did several other bills affecting engineers or the electrical industry. However, a contractors' licensing bill passed and was signed by the governor. . . . In Colorado a bill establishing a state electrical board, inspection and licensing of contractors and electricians was killed in committee. Likewise, a bill for a similar setup with plumbers was killed after a second reading. . . . In Washington a complete revision of the state electrical law failed to come to the floor. Most legislatures seemed to revolt against so much demand for regulation of everything from barbers to engineers.

Wire table revision

No code changes to consider yet, the Electrical Coordinating Committee of National Fire Protection Assn. will not meet with the NFPA at its national convention in Los Angeles May 20-24. However, a Western meeting of members of Panel 8 has been suggested in Portland May 17 to consider possible revisions of the wire tables in the NECode, resulting from the fact-finding report sponsored by the American Iron and Steel Institute. Joe Gray, Portland, chief inspector, is a member of the panel.

Through jungle

A Criss-Cross Index Guide to the 1956 National Electrical Code is being offered by Wing Publishing Co., 3940 Grand River Ave., Detroit, priced at $2.

Lighting prizes

A new lighting contest—the 1957 International Lighting Competition—opened March 15 and closes Oct. 25. It is sponsored by three McGraw-Hill magazines—Electrical Construction and Maintenance, Electrical Wholesaling and Electrical World—in close cooperation with National Lighting Bureau of NEMA. It is open to electrical contractors, distributors, architects, engineers and utilities. Some 120 awards in four categories, with cash prizes totaling $5,400, will be given. Separate awards are provided for industry, store, office, institutional, outdoor lighting and residential lighting jobs.

To grass roots

Another new General Electric Supply branch has been established at Idaho Falls, according to A. E. Fleming, manager, supply sales division of Salt Lake City. J. N. Smith, son of the late Will O. Smith, is store manager. Also announced are some transfers in the other branches. Bob Marsh is store manager at the recently opened Grand Junction. John Burke was transferred from there to Albuquerque April 1. R. T. Savage is store manager in Pueblo, transferred from Salt Lake City, and Bob Swanson at Colorado Springs, transferred from Denver. George Alm is store manager at the Great Falls house, established in November.

Practical training

Two professional estimators courses are being run in Los Angeles and a third will start April 22, according to Charles Hays of Electrical Estimators Inc. The classes are limited to 20 maximum and run for two nights a week for 16 weeks. One class meets Mondays and Wednesdays; the other Tuesdays and Thursdays. Enrollment is largely of electrical contractors and their key personnel. The course has a $250 tuition and combines actual practice under experienced professional estimators as well as theory. A correspondence course is being developed for those located too remote to reach the class sessions but will give them an opportunity to come in and spend two weeks in actual practice in the school.

Bright meeting

"Traffic Safety Light," a moving picture produced by the PCEA in cooperation with the California State Division of Highways for the governor's safety conference at Sacramento last fall, will be shown at the special street and highway lighting meeting of IES Golden Gate Section May 9 at the Elks Club, San Mateo. The "Lamp Lighters," a group organized among street-lighting people, will have charge of the program. On the panel for discussion of street and safety lighting in general will be Larry Soares, city electrical engineer, Oakland; Ray Matthews, State of California; Henry Tilson, consulting engineer; Ken Hunter, municipal engineer, San Leandro; Crawford Hill and William Addison, PG and E. Other speakers from the police department will also appear.

Across the border

A joint meeting between the Puget Sound Chapter, IAEI, and the Electrical Inspectors of British Columbia will be held in Bellingham, Wash., June 8. E. D. Tubbs of Bellingham and J. R. Dooley of Vancouver are making the arrangements.

Turn about

Montana Chapter, NECA, plans a big electrical industry meeting June 8 to honor Montana Power Co. for its work in furthering the electrical contracting industry.

EMEA north and south

Electrical Maintenance Engineers Assn. of the Columbia Basin held election of officers at its March 28 meeting in the General Electric apparatus sales office, Portland. W. P. Luckow was the only candidate for president, but R. W. Drewfs and W. W. Kellis were opposed for vice-president, and J. S. Poage and G. L. Wright for secretary-treasurer. . . . EMEA of Southern California plans to establish clubs of its members in the various industrial areas of southern California. In May a meeting is to be held in the San Fernando Valley for those who cannot come to regular meetings in Los Angeles, but who belong to the association and make special effort to attend its big events, such as Boss's Night, its stag, show and conferences. The same will be established in Long Beach, Pomona, Santa Monica and the Riverside-San Bernardino areas if the San Fernando Valley idea works out, according to Charles Hayes, president.

Take to advance

If initial big attendance is an indication, the evening course in advanced lighting problems started March 27 by Golden Gate Section, IES, is a big success. More than 100 started the course, which runs to 10 sessions and costs $20. Classes are conducted at Western Merchandise Mart, San Francisco, on Wednesday evenings until June 12. C. Very of All-Brite, South San Francisco, is chairman of the education committee.

Warn beginners

"Facts on Electrical Shock," a one-page mimeographed sheet, has been prepared by Joe Gray, Portland chief inspector, for distribution by the Portland apprentice school. It has proved popular enough that extra copies are being distributed to some of the school vocational classes in other trades.

Thorough coverage

Dex Hinckley, executive secretary, Illuminating Engineering Society, not only attended the three regional IES conferences in the West on his trip in April, but held special meetings with officers of chapters and sections of the Society in Winnipeg, Calgary, Edmonton, Victoria, San Francisco, Sacramento, San Jose, Denver and Pueblo. In San Francisco he conferred with John Walsh over plans for the 1959 national technical conference in that city.

See at crossings

A grade crossing lighting test was staged on Bay Shore Boulevard, San Francisco, at a Southern Pacific spur track crossing to test lighting and signals as well as floodlights. It was sponsored by the PCEA technical subcommittee on highway lighting, in cooperation with the California State Highway Commission. Motion pictures were taken and brightness and visibilty tests made.

To school for light

An illumination seminar sponsored by the Portland General Electric Co. is being planned at the University of Portland campus August 26-29 for architects, school administrators, commercial building managers, factory managers, merchants, builders, buyers, contractors and distributors. The first day will be devoted to school illumination and maintenance. The second to office and shop in the morning, and factory and industrial lighting in the afternoon. On the third day one-hour sessions on merchandising with light and color will be given successively for commercial people who can drop in for a short time. Similarly, residential illumination will have a session the fourth day. Chester Jarrett, manager, illumination sales, is handling the project. . . The high school home economics classes in Portland are also being given classes on illumination, decoration, etc., in the home through PGE sponsorship.

Dedicate new home

Open house to the industry was held by the Los Angeles Chapter, National Electrical Contractors Assn., at its large new building at 24th and Broadway, Los Angeles, April 14. Erected on the site of the old residence the chapter bought and used as an office years ago, the new 44,000-sq-ft two-story building provides rental space on two floors and 4,000 sq ft of office for the chapter on the second floor. Following a tour of the building to the invited guests, including city and county officials from all four counties in which the chapter operates, a dinner was given at Roger Young Auditorium, according to Warren Penn, executive vice-president. The lease of the building will pay for it in 10 years, giving the chapter free office rent, and then return it income.

Local group

An Independent Electrical Wholesalers Assn. has been organized in Phoenix with seven member firms, five from Phoenix and two from Tucson. Sam Schurgin is secretary-treasurer.

To reduce misuse

Standards for enclosed switches will soon be changed by Underwriters' Laboratories to require a permanent label having thereon the maximum horsepower rating without a tie-in to the size of fuses. This comes as a result of recent meetings at which the misuse of the paper labels regarding fuses and the misapplication of horsepower ratings were brought to Underwriters' from Western representatives.

Losses

More old-timers pass on—Barney Jankelson, who had retired in 1955 as president of Incandescent Supply Co., died March 25. . . Matt W. Whitney, pioneer electrical contractor-dealer of Colorado Springs, word has belatedly reached us, died in January after a protracted illness, age 72. He was responsible for Colorado Springs' Christmas street-lighting decorations. His two sons will continue the business. . . Clyde Williams, Westinghouse Electric Supply, San Francisco, died in late March. . . Howard B. Millard, partner in Millard & Haggerty Electric Co., contractor of San Jose, died in March.

New Unity from Forums

Housepower forums have begun in many places in the West. They were designed to train electrical contractors and their people to develop real noncompetitive business and capitalize on the interest aroused in the National Housepower and Live Better . . . *Electrically* promotions. The forum idea, first tried in the Detroit area, was put to work in the Portland, Ore., Salt Lake City and San Diego areas last month. Moreover, it is bringing together groups who have never worked together in the past. With the incentive of creating better markets for all, contractors are responding.

The Housepower forum in Portland started March 19 with the initial attendance of 15. It is the joint effort of the Portland General Electric Co.; the National Electrical Contractors Assn., Oregon-Columbia Chapter; and the independent Pacific Electrical Contractors Assn. It will run for six consecutive Tuesday nights in the conference room of PGE, Portland. Bill Tait of PGE conducts the conference type of class with the assistance of Nick Mason.

A preview of the course was held for a committee of NECA. This was done to determine if it was suitable to take into the field under NECA sponsorship in parts of Oregon not served by PGE. When the first course is run off in the Portland downtown district, another course will be run on the other side of the river and later to Salem for the Albany, Dallas, Salem and Corvallis area.

Participants are charged $15 for the course, which includes visualizer kit and all the material. Additional members of a contractor's firm are charged only $5. This was done to make the course as much as possible self-supporting so that when taken into other areas it would likewise stand on its own merits. Prior to the Salem course, the NECA plans to start its management principles and supervisory training course. This preparation of management shows those participating their need for more education along the lines of selling. Such training in Portland has paved the way for the initial course.

In Salt Lake City, the Intermountain Electrical Assn. wiring committee made arrangements with the University of Utah for the conducting of a Housepower forum at that college beginning with the April term. Here again it is the joint effort of the Utah Power & Light Co., NECA and independent contractors. Some 18 indicated their willingness to take the course. Arrangements are being handled by Ad Woolley, Utah-Idaho Chapter, NECA, manager.

In Boise, a similar plan is under way by the Snake River Valley Electrical Assn. and Idaho Power Co. A meeting on the subject was to be held in Boise early in April.

The Electrical Contractors Division of the San Diego Bureau of Home Appliances was making plans to conduct forum classes in that area also. Two other places where the forum idea will probably be integrated into existing home modernization programs are Denver and Phoenix.

Bill Tait speaking, Nick Mason helping

In Phoenix, the forum will be started in June, according to Les Waggoner, the wiring consultant of Arizona Public Service Co. It will be sponsored by the Electrical Industry Joint Board, of which Jerry Kelleher, NECA chapter manager, is the administrator.

In his own store at Walnut Creek, Andy Maser, center, receives a Certified Lighting Certificate from Bert Reynolds, manager, Northern California Electrical Bureau. Looking on is John Wilhelm of PG and E, who cooperated with the lighting plan

Store Lighting Is Winner

His own new store helped Andy Maser, proprietor of Thompson Electric Co., Walnut Creek, to win second prize in the Northern California Electrical Bureau's certified lighting contest among contractors.

The Thompson Electric Co.'s new store occupies a prominent place along the main street of Walnut Creek. It is set back to provide customer parking space in front. Ceiling-to-floor windows give a front view inside the entire store and the certified lighting job makes everything in it visible freely to passers-by on the highway.

Some of the features of the building include a soundproof TV repair shop, large shop and warehouse space at the rear with an aluminum-covered outside yard under which the pipe racks are built. Offices are at the rear of the display space. The appliance warehouse is at another location. Andy Maser is president of the Northern California Chapter, NECA, and active both in adequate wiring and merchandise promotion.

ELECTRICAL WEST

FPC Upheld

MANY people were gratified by the Supreme Court's refusal to review Idaho Power Company's license to develop the Hells Canyon project. The utility's president, Tom Roach, characterized the decision as a triumph for the orderly process of government.

In one sense, it was even more than that. The high court, by standing behind the Federal Power Commission decision to let Hells Canyon be developed by private enterprise, reaffirmed the authority that Congress has delegated to the Commission. Any other action by the court would, by implication, have questioned the competency of the FPC decision and opened a whole new arena for public vs private power protagonists.

Plain Talk

DR. FRED LINDVALL of California Institute of Technology stood up last month and talked straight from the shoulder about engineering education. His message has a particular import for the utility industry. He seemed to be saying:

1. The days when the colleges trained engineers predominantly for any one industry are over. By inference, electric utilities should give up the fight and learn to use the high-caliber young men that are coming into the field.

2. If the question of quality vs quantity is raised (and it is), engineers, educators, students and potential employers all vote for quality. Again, by inference, the days when engineers can be used on a drafting board or in semiprofessional jobs are over. In the future it will be necessary for utilities to make up for the lack of utility-oriented courses by more and better on-the-job education.

3. If engineers were used to their full potential, the shortage may well be in first-class technicians rather than second-class engineers. By inference, attention should be given to developing and aiding in the development of draftsmen, engineering assistants and subprofessional workers, all of whom, in general, are skilled technicians.

4. While there is a need for a realistic look at engineering pay scales, Dr. Lindvall finished his talk with the words "if you want to keep first-class scientists and engineers, learn how to treat them as the professionals that they are."

These views are realistic. If they represent the consensus of prominent educators across the country, there is but one conclusion — power companies are going to have to do some plain thinking about their engineering procurement, training and personnel development programs.

Question and Answer

THE PCEA Engineering and Operating convention in Los Angeles was a demonstration of the real value of association work to the utility industry. Within the two-day period, and oftentimes within minutes, the industry's most challenging questions were followed by realistic, down-to-earth answers.

For example, one speaker at the general session urged sales programs aimed at improving load factor rather than at kilowatt sales as an end in themselves. In subsequent section meetings, specific discussions on designs for handling peak loads as well as on Western utility experience with the heat pump were presented. The latter appears to be an important load factor improver.

Another keynote speaker charged the industry with the need for getting more good engineers in the utility industry—while across the room an IBM 650, engineer multiplier superb, sat waiting its chance to show how it could make better use of engineering talent that is already available.

The need for lower cost underground transmission and distribution was short-stopped by several papers, while the necessity for holding costs down while im-

EDITORIAL VIEWS

proving service was skillfully handled in another thoughtful approach to that important problem.

Almost without exception the challenges presented by keynote speakers were, to a greater or less degree, given serious consideration in subsequent section meetings.

In honesty, there was little of a revolutionary nature in the program. The important thing is that progress was apparent and fairly consistent on all important fronts. This is the stuff of which progress is made. It is the reason why association activity is invaluable to the industry.

Pace Gets Faster

ONE of the most dramatic examples of the rapidity with which technological advancement is taking place is found in the modernization of Redondo No. 1 steam plant. When one hears the word "modernization," the mind automatically visualizes some facility 25 or 30 years old. This is not the case at Redondo.

Redondo was completed by the Southern California Edison Co. after World War II. Although it has been in service only eight years, the company's engineers found that by modifying the design of its automatic control system a substantial number of operating personnel could be released to fill vacancies on the staff of new stations built subsequently as a part of the company's expansion program.

It is provocative because it leaves wide open the question: How modern is modern?

Computer Cooperation

DESPITE remarkable mathematical capabilities of present-day computers, their usefulness is oftentimes limited by the "mind behind the monster."

Complicated problems, which the machine can solve in minutes, may require months of programming (instructions to the monster) before the first problem can be solved. These instructions, commonly called routines, may for the next few years prove to be a limiting factor in the solution of engineering problems on computers. A routine, once it has been created, can be duplicated in seconds and transmitted by mail or wire to another computer section, thereby eliminating the need to duplicate the programming of the problem in two locations.

It would seem to be a worth-while function of Western utility associations to form computer committees and establish a policy of free interchange of computer information (which isn't always the case) and split up the task of programming common problems so that in the near future utility engineering organizations will be in a position through their combined brain work to keep the machine busy doing more and more drawn-out engineering computations.

The future is not for little men with little minds. It is not for men without vision who fear progress. It is not for timid men who early were frightened by the story of Frankenstein. And it is not for those arch reactionaries who seek to shatter big enterprise and to force American industry back into the puny production patterns of its Nineteenth Century infancy.

No. The future is for men who dare to have great expectations; and who—with the guidance and encouragement of all the people for whom they strive—will also have the courage, the persistence, the wisdom and the patience to transform those expectations into realities!

Roger M. Blough, chairman of the board, U. S. Steel Corp., in an address before the Economic Club of Chicago, March 13, 1957.

Audiences like this one at San Mateo added up to a 10% over-all increase in attendance at PG and E's cooking schools

New approach to cooperative cooking schools

Brings Three-Way Benefits

A new twist to an old promotional idea paid off for Pacific Gas and Electric Co., its customers, electrical dealers and distributors. It brought a fresh approach to the time-honored cooking school, increased its three-way benefits and won for the company's home economics department the Laura McCall Award for advancement in electrical living.

How the idea was born

PG and E wanted to promote the Live Better . . . *Electrically* program through cooking schools but was convinced that a fresh approach was needed. True, dealer cooperative schools, conducted throughout the system for several years past, continued to have excellent acceptance but the utility did not want to coast along with the same group and the same routine. The new approach, it felt, should be one that would stimulate new interest at a higher level of buying power, at least sustain attendance and build traffic in dealer stores.

The answer, it decided, was a "Best Cook in Our Town" contest as a cooking school feature. Contestants would not enter a cooking competition but would be selected by women's clubs.

How it was handled

PG and E invited organized women's clubs in each community to enter contestants. Invitation was through newspaper publicity, individual letters to clubs, or both, with a telephone follow-up if response was slow. To keep costs down, the number of contestants was limited to between 12 and 15.

Inducements to participation included a $50 check to the club whose contestant was voted "Best Cook in Our Town"; a grand prize of a de luxe electric mixer ($52.50 value) to the winning contestant; a $15 electric knife sharpener to each of the other contestants; newspaper publicity about the clubs and their service projects.

Two balloting systems were developed, with choice left to local utility people and cooperating dealers. The first system was designed to build traffic in dealer stores, the second put balloting right at the cooking school.

Under the first system, the one most generally used, voting took place during the entire week prior to the cooking school. A list of cooperating dealers' stores with their addresses was published in the local newspaper and women were urged to vote—not in one store but in every store. As incentive, each ballot cast entitled the voter to a chance on the dealer prize to be given away at the cooking school. If a woman voted, say, in 20 stores she piled up votes for her contestant and in addition had 20 chances to win a prize.

To insure dealer opportunity for individual contact with each voter, ballots were not left on counters but were given out only on request. If a salesman failed to get the name and address for his prospect list, it was on the ballot.

Voting in dealer stores was closed

Recognition for an Idea

For the idea back of this cooking school promotion Marguerite Fenner, Pacific Gas and Electric Co.'s home economics director, won her fifth Laura McCall Award. She is shown (right) receiving the bronze plaque from McCall's Elizabeth Sweeney Herbert at the recent EEI Sales Conference in Chicago. The awards have been given for the past 16 years to provide public recognition for utility home economists who have distinguished themselves, their companies and profession by contributions to homemaking through use of electrical appliances. Mrs. Fenner is the only person to receive the award five times, having won it previously in 1945, 1946, 1948 and 1952. PG and E's home economics program is one of mass promotion and education executed through cooking schools, demonstrations, lectures before adult and child groups. In addition to directing this program, Mrs. Fenner has organized and conducted Equipment and Home Lighting Workshops for home economics teachers, four of which have been approved for upper division college credit. She is well known also for her work with the American Home Economics Assn.

the evening before the school and all ballot boxes were taken to a central location for counting. Usually a committee of dealers, sometimes supplemented by company personnel, handled this tabulation, which multiple voting made large.

When balloting was at the cooking schools, various devices were used. In some instances ballots were printed with name and club affiliation of each contestant; in others a ballot box was provided for each contestant and door prize ticket stubs were dropped into boxes as votes. Ballots were counted during the LBE program.

All contestants were asked to attend the school, were seated in a reserve section and introduced on stage by name and club affiliation. The winner was then announced and given the check for her club and her own prize. Other contestants received their gifts as they went off stage. In many communities local florists donated corsages for the contestants.

The Program

The LBE cooking school lasted one hour and 40 minutes. It included a 30-minute electric range or portable appliance demonstration by a power company home economist; the movie, *Meet Mrs. Swenson;* a 15-minute housepower presentation by PG and E's Robert Haskel., who uses magic to entertain and instruct; introduction of contestants; drawing for dealer prizes.

How it was promoted

In over-all promotion, Northern California Electrical Bureau, representing the distributors, local dealers and newspapers, participated with PG and E. Promotion for the contest itself was handled by the power company, cooperating with local newspapers. PG and E paid for contest prizes.

Continuing newspaper publicity about the clubs stimulated interest and "got out the vote." Dealer and company ads regarding both contest and cooking school gave impetus.

Art Gully, PG and E manager at Fort Bragg, gives prize to Marlene Knivila

The results

The "Best Cook" contest was conducted in conjunction with 76 LBE cooking schools, one above quota set at the beginning of the year. Total attendance was 94,962 (average 657), a 10% increase over 1955.

Dealer after dealer reported that quality of participation was definitely higher than in previous store-traffic-building activities. Women whom dealers want to reach but who would not ordinarily take part in a promotion of this kind visited stores to support their clubs. Higher income level was indicated by the number of resulting sales. An overall upgrading in class of women attending the schools also was observed.

Floor traffic during the balloting exceeded that created by any previous promotion but there was no "mob scene" at any time. With an entire week for balloting, dealers had an opportunity to spend more time with each individual. Prospect lists as well as sales were satisfying.

Here's the tabulation of ballots from one contest in a city of 12,270 population with 17 dealers cooperating: 1,058, 927, 916, 902, 894, 885, 868, 866, 836, 820, 820, 816, 778, 761, 747, 727, 711.

Because dealers have asked for it, the plan will be used again this year. After that, Marguerite Fenner believes, it will be time to think up another new idea.

Chairman Carl Edvalson, Edvalson Appliance, with IEA President DeLamar Holt, Utah Power & Light Co.

S. Morgan Sorensen, Southeast Furniture Co., and Dr. W. D. Stratford, Weber College, afternoon speakers

Robert O. Trottier, IEA managing director, and Frank Falge, LBE director for eight Western states

IEA speakers tell how to

Sell Better Electrically

Planned to help members "sell better electrically," Intermountain Electrical Assn.'s annual conference at Ogden, March 22, was packed with practical suggestions for industry and area development. Some 200 took part in all-day and evening sessions at the Ben Lomond Hotel arranged by President DeLamar Holt, Utah Power & Light Co., and Conference Chairman Carl I. Edvalson, Edvalson Appliance & Heating Co.

Keynoting the conference, Frank M. Falge, director of the Live Better . . . *Electrically* program in eight Western states, told progress of the LBE and Housepower promotions. In 1956, he said, these industry programs were concentrated on selling the broad concept and in 1957 they are moving more specifically to products and the cash register.

The idea is to work together 100% to get a bigger share of the consumer dollar, he declared. Electricity now does a little better than tobacco but not as well as liquor, he pointed out. "Ask your newspapers to include the LBE emblem in every ad they run for you," he urged. The electric industry has been complacent about the advantages of electricity and has forgotten to sell them, he said, while gas is always mentioned in gas appliance advertising. It is the job of all of us to translate the preference for electric into business, he reminded.

The industry must have courage to sell the things it has that the public really wants, such as air conditioning, Falge believes. "And let's not be chicken about electric heat," he added, "let's talk it up." Electric water heating may cost more but redecorating will cost less, he said. "We are in a growing two-home market, which doubles everything we sell. Let's make Live Better . . . *Electrically* the most famous bywords in America."

Faster reading

Pointing out that vision is an electronic process, Dr. Curtis Dearden, Dearden Visual Clinic, luncheon speaker, punctuated his remarks about reading ability with an audience test. As speed increases, comprehension increases, he said. Speed reading training substitutes a poor habit for a better one, he stated, and permits reading for thoughts instead of words. Anyone can be taught to read faster and will get keener eyesight as a bonus, the experts contend.

A new industry

Opening the afternoon session, Chester B. Ensinger, plant engineer, Marquardt Aircraft Co., told of the new self-sufficient operating facility being housed under one roof at Ogden. Since there is no similar industry in the area now, young people must be trained for the high-precision work involved, he said, and his company is grateful for the caliber of youth that is being schooled at its temporary plant, cramming into one year what would normally be a two-year course. Training these men who will be the supervisors of the future costs Marquardt about $1,800 each, Ensinger said. While only a few were selected initially, it is expected that in from three to five years the company will employ several thousand in the area.

How to get a share

Pointing out that the big markets, big business opportunities and big dollars have begun to move into the area, Wendell J. Ashton, vice-president, Gilham Advertising Agency, gave a few answers to the question, "What can I do to get my share of the catch?"

Advertising is much like fishing, he said, the same lures may not always attract but catches will come to him who uses skill, patience and boldness in going after the big ones. A merchant who tries to succeed without advertising is like a fisherman who casts without a lure, he declared.

Seven points, he suggested, can make advertising pay handsomely. They are:

1. Change your lures — Adjust merchandising and advertising to the moods of the times. Approximately half of America's population today cannot remember the depression, he reminded, and every school girl now can expect to spend at least 25 years in paid work outside the home.

2. Use imagination—For the most

part dealer advertising looks and sounds alike. These ads will be more effective, Ashton thinks, if they select one customer advantage that is unique and has appeal; put it into a slogan and repeat it again and again and again. "As you begin to tire of it, chances are it will be just starting to fix itself in the minds of potential customers," he told the group.

3. Take the family along—Some wonderful advertising ideas come from families and secretaries.

4. Cast where they are biting—Strong competition means hitting harder and more often. One way to make the advertising dollar pull more is to tie into industry campaigns.

5. Check tackle carefully — The industry needs to remind itself of what it has to sell and where its best prospects lie. If women are the big buyers, perhaps appliance ads should be placed on the women's page and it is well to remember that working wives cannot be reached with morning and afternoon radio and TV programs, he pointed out. While all media are equally successful, if the budget is small, say $20,000 a year, in general it is best to concentrate on one, he thinks.

6. Keep at it—We are advertising to a passing parade.

7. Keep enthusiastically patient.

It's the little things

Just as the electric industry is built on something so small nobody has seen it, so are good public relations built on little things, according to Dr. William D. Stratford, dean of men at Weber College, Ogden. Many industries build plants, get supplies, spend money and energy, then ignore the last foot—when the customer meets someone from the organization. Holdovers from a seller's market must disengage their old habits from this new market, he said. Such simple words as "Thank you," "We appreciate your business," "Come again" will make a difference, he reminded. "High-falutin courses are not needed, a look in the mirror will do," he said.

How to do business today

S. Morgan Sorensen, vice-president and merchandising manager of the Southeast Furniture Co., Salt Lake City, discussed ways of doing business in this bitterly competitive era, when competition is not with one another but with other commodities and services.

"We can't go on selling price, outlying liars, outgimmicking gimmickers," he believes. "We are going to have to sell merchandise on its merits at a fair price.

"We must learn to do business on smaller margins before somebody else does and pins our ears back," he warned. It is necessary to cut overhead per man-hour, to get more volume and better performance, to learn how to do things cheaper because the public and the competition will not allow a dealer to get rich on one transaction.

Dealers must develop a sense of morality, he said. They must learn concepts and stick with them until they gain the respect and confidence of their customers.

They must be good housekeepers. Merchandise cannot be sold out of a barn or a garage or a warehouse. It must be displayed. The store does not have to be fancy if it is clean. Overhead can be cut and volume increased.

"If we are successful, and we can be, the future looks mighty rosy," he believes.

Creative selling

Most men and women selling today long for security but don't want to work long enough and hard enough, J. B. "Kip" Anger, Motorola assistant national sales manager, Chicago, pointed out in an inspiring banquet talk. Instead, they sit back and blame something or somebody else; complain that the boom is over. "Business is good. It's mixed but it's good," he said.

Pointing to the TV industry, he declared that it is in its infancy and needs young blood, more salesmen and the kind of people who can sell creatively. Make money on repeat sales, he advised. Obsolescence is the key to salesmanship.

Color TV is on the threshold, he believes. By 1958 pessimistic dealers will have to accept it or fail, he declared. TV sets have gone up in quality while prices have gone down, he said, and anyone who cuts price on radio and television today is not selling but giving away his merchandise.

Don't give lip service to this great association, he urged in conclusion. Put some action in it. "Don't go through the revolving door on the other fellow's push."

Other Features

Other evening features were the G-E House of Magic, being shown to high school students in the area; music and a pantomime. William H. Mott, General Electric, was banquet chairman and Donald R. Dyrenforth of that company was in charge of the distributor's friendship hour preceding it.

Contributing to the program's success were the beautiful setting at Ogden and a hard-working and efficient committee. Chairmen, in addition to those already mentioned, were: program, Jack Geofarth, Mountain States Tel & Tel, Salt Lake City; publicity, Homer H. Peterson, station KALL, Salt Lake; attendance and registration, J. R. Christensen, J. R. Christensen Agency, Salt Lake; ladies' entertainment, H. Keith LaFleur, Mountain States Tel & Tel, Ogden; luncheon, George E. Larsen, Provo City Utilities; afternoon recess, E. Leland Nichols, Lee's Appliance, Ogden.

From the Salt Lake Retail Chapter: Richard Bennett, Bluhm Electric; Sherman Anderson, Granite Furniture Co., chapter president; Plato Kanell, Kanell TV and Radio Service. Bennett and Kanell are directors of the retail chapter

One of the winners—Mrs. Keith D. Reinhart. Shown with her from left to right: Warren Lawrence, Lawrence Appliance; J. P. O'Connor, assistant division sales manager, Idaho Power, Boise; Mel Foster, Warehouse Furniture; Harold Toedtemeier, SRVEA president. Lawrence and Foster are Boise Hotpoint dealers

Two of the newspaper ads designed by the sponsors to promote the essay contest and to tell a use story on dryers

Members of the Livewires, SRVEA women's auxiliary, judge more than 9,000 entries during the nine-week Reddy Kilowatt dryer contest. Shown here are Mrs. Henry Falkner, Mrs. Joe Wright, Mrs. Lysle Keith, Mrs. Carl Young, Boise

This Essay Contest Worked

An essay contest that brought returns both in prospects and sales was the recent Reddy Kilowatt "Dryer Days" contest sponsored by Idaho Power Co. and the Snake River Valley Electrical Assn. During the two-month promotion 647 dryers were sold by cooperating dealers and more than 9,000 entries were returned by the company's 100,000 customers.

The contest was in the form of a statement to be completed in 25 words or less: "I want my family to have the benefits of an electric dryer because. . . ." Each entry blank carried the name and address of the contestant, who was asked to fill in the name of a favorite dealer and the next major electrical appliance the household expected to buy.

Blanks were distributed through dealers, by direct mail (in the form of an attractive promotional piece with entry blank on a business reply card) and in newspaper ads. Advertising was designed to tell the use story as well as to promote the contest. Kick-off was in a series of display ads in every daily and weekly newspaper in the area. Radio and TV also were used.

All customers of Idaho Power were eligible except employees of the two sponsors and appliance firms. Weekly judges were volunteers from the Livewires, women's auxiliary of the SRVEA.

Prizes were a dryer a week for nine consecutive weeks. To keep customers from postponing dryer purchases until after the contest period, a special $100 bonus was offered to anyone who bought a dryer and then won in the contest.

Entries were turned over to the dealer named by the contestant for his prospect list. Those that did not indicate a favorite dealer were prorated. Prospects were brought in also by the power company, whose entire sales force was out promoting the contest.

Ceremonies in connection with the weekly awards were given good space in local newspapers. Each prize dryer was given out by a dealer in the particular make. The one whose store was closest to the winner's home was chosen.

Although members of the industry do not agree on the pulling power of essay contests, none could deny that this one worked.

ELECTRONIC TESTING... BY PUSH BUTTON!

Patent applied for.

Yes, just push a button and automatically, HyperCore Distribution Transformers are Tested, Proved and on their way . . . all neatly crated, of course . . . to your utility.

Our new, automatic testing system, applied to the new and enlarged production facilities, guarantees production of HyperCore Transformers of the quality you want, in the quantities and ratings you want.

Control room for the automatic test system contains equipment which automatically records test data for each transformer as it goes through the test area.

Manufacturers of MOLONEY ELECTRIC *Transformers for Utilities, Industry and Electronic Applications*

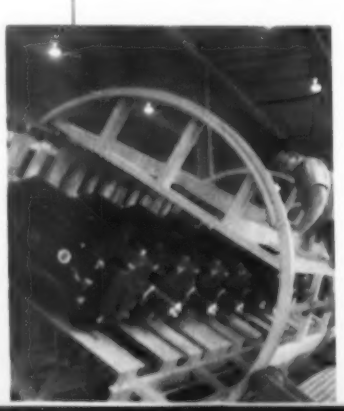
SALES OFFICES IN ALL PRINCIPAL CITIES
FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

Bulletin H-307-15

Test Control Room—All test station controls, test metering and recording equipment, and electronic rejection circuits are installed and monitored here. Filtered atmosphere, pressurized to eliminate dust and dirt is constantly maintained to insure accuracy of tests. Results of each transformer's tests are automatically recorded here.

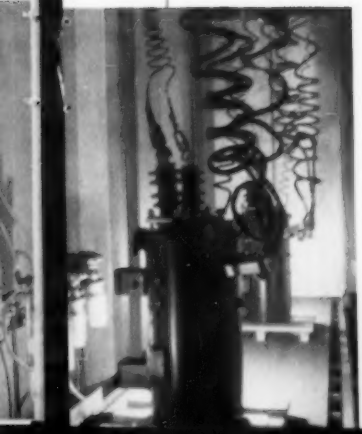
Automatic Test Line through which all HyperCore Transformers must pass successfully before crating and shipment. All standard ASA Tests are made here automatically. Transformers are energized for these tests from overhead bus and test result is automatically recorded as each transformer reaches each test area. This eliminates the possibility of human error.

Oil-tight Leak Test . . . transformers are turned upside down to insure that all opening gaskets are leak-proof. Every seal must withstand the gravity pressure of the oil before shipment. This insures that transformer oil is kept "in" and air, moisture and all foreign matter is kept "out."



The audible sound level of each HyperCore Transformer is recorded as it passes through the sound chamber. These tests are performed automatically on each transformer. Super-sensitive microphones in close proximity to the transformer accurately record the sound level in this chamber which has a lower ambient noise level than most radio broadcasting studios.

Prior to entering automatic test system, HyperCore Transformers, after sealing, are conveyed into vacuum tanks while core-and-coil units are still well above ambient temperature. Vacuum pressure is applied to remove any air that may be trapped in the transformer. The transformers are then ready to begin tests in the automatic testing line.



After assembly and tanking, HyperCore Distribution Transformers are conveyed to the test department. Then begins the trip through the electronically controlled automatic testing department. A moving conveyor belt moves each transformer through each test area. Here automatic testing, analysis, approval or rejection takes place. This view shows the overall test area.

All standard ASA tests are made on each transformer plus noise level test, impluse test, "upside-down" leak test and CSP Breaker test, when applicable.

MOLONEY ELECTRIC

Finish imperfections such as scratches or scuffs are spot sprayed as the transformers leave the final leak test area. Deteriorating elements are thus not able to reach the metal surfaces of HyperCore Tanks.

After final spot spraying HyperCore Transformers pass through an automatic drying oven. This insures that all touch-up spots match the original tone of the baked tank finish and also guarantees that the entire finish is completely impervious to all normal atmospheric conditions.

When HyperCore Transformers reach the crating department they are performance-proved, leak-proof and wear a perfect protective paint coating. With HyperCore . . . if it's crated, it's as rated!

Warehouses, completely stocked, are maintained throughout the United States to insure fast delivery of HyperCore Transformers in the quantities and ratings you desire.

PHOTOGRAPHS BY WESLEY BOWMAN

MOLONEY ELECTRIC

LITHO—U. S. A.

MOLONEY ELECTRIC COMPANY

Manufacturers of Transformers for Utilities, Industry and Electronics Applications

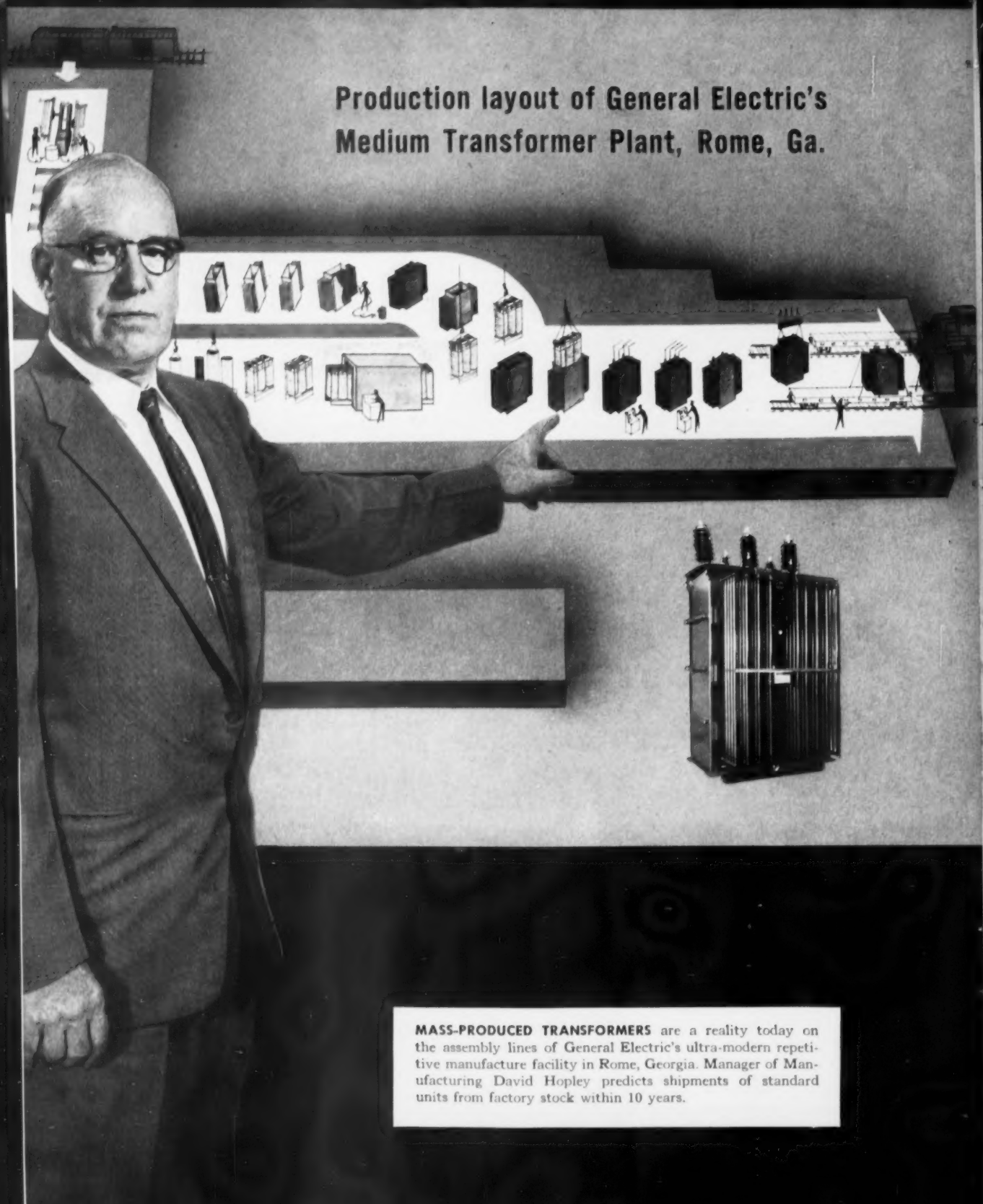
SALES OFFICES IN ALL PRINCIPAL CITIES

FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA

PRIZE DRAWING—As members of the judging committee look on, Patti Prichard, TV star, hands to Frank Falge, National Electrical Week chairman for the area, the winning name in Northern California Electrical Bureau's $20,000 Appliance Prize Drawing. Held as a part of the Electrical Week celebration, the promotion was a sales and store traffic builder. Judges were, from left to right: W. E. Lind, PG and E; Vern A. Brown, Graybar; C. W. Goodwin, G-E Supply and NCEB president; Frank Craddock, Westinghouse; A. Cameron Ball, manager, Western Merchandise Mart; B. W. Reynolds, NCEB manager. Grand prize winner was Gordon J. Oakley, Coalinga, Calif. There were 100 other lucky people among the 71,736 PG and E customers entering the contest. All entries were deposited with dealers in the 46-county area served by NCEB. As a direct result of the contest 424 major electric appliances and 184 electric housewares already have been sold and dealers estimate the promotion has provided them with an additional 7,200 good prospects. Retail value of the sales completed to date totals $112,527

HIGH IN SALES—A. S. Gilbert, general sales manager of Idaho Power Co., presents recognition plaque for top district sales performance in 1956. Left to right are S. C. Rhoads, eastern division sales manager, Pocatello; F. B. Grimmett, Aberdeen district, Aberdeen; Gilbert; L. W. Brainard, eastern division manager. Top position for over-all sales performance as well as top district honors went to eastern division. Award was made at a Boise sales meeting

WINS HUGHES AWARD—For its 1956 loadbuilding program in the commercial electric cooking field, Washington Water Power Co. received the George A. Hughes Award given by Hotpoint. Here Blair Plowman, WWP's commercial and industrial sales supervisor, receives the trophy from George W. Ousler, chairman of the awards committee of Edison Electric Institute. William C. Ayres, Hotpoint general manager, commercial equipment department, watches the presentation at EEI sales conference. Approximately $105,000 in commercial electric cooking equipment was sold within the company's service area last year. As a result, electrical contractors in the area did approximately $100,000 worth of wiring and installation business. About 85% of the restaurants and institutions in WWP territory use electric equipment



MASS-PRODUCED TRANSFORMERS are a reality today on the assembly lines of General Electric's ultra-modern repetitive manufacture facility in Rome, Georgia. Manager of Manufacturing David Hopley predicts shipments of standard units from factory stock within 10 years.

A GENERAL ELECTRIC 10-YEAR FORECAST:

"Off-the-shelf" delivery of standard-design, automation-produced medium transformers

In 1967, electric utilities will be able to buy standard-design medium transformers direct from manufacturers' stock. This will permit immediate satisfaction of emergency load demands as well as shorter planning cycles for normal load growth. So forecasts David Hopley, manager of manufacturing at General Electric's Medium Transformer Department in Rome, Georgia.

This tremendous reduction in delivery time (from the present 10 weeks for standards, and up to 16 weeks and more for specials) depends on continuing the utilities' established trend to standard transformers. For, as acceptance of standard-design units grows, manufacturers are able to move toward automated production of "stock" medium transformers.

For instance, repetitive manufacture facilities at G.E.'s $25,000,000 Rome, Georgia, plant already have helped halve delivery time of medium transformers in the past 10 years.

YOU GET REAL BENEFITS *TODAY!*

During the transition period leading to entire systems of standard-design transformers, electric utilities are enjoying current benefits from General Electric medium transformers. For example:

Lower price—Standardization of design results in an 8% saving in price on General Electric RM (Repetitive Manufacture) medium transformers.

More and better features—Standard design makes it economically possible for G.E. to offer such extras as Formex* insulated windings, control-center arrangement of instruments and accessories, reversible junction boxes, and many others.

Higher quality for longer life—G-E repetitive manufacture techniques permit 18 assembly-line tests and 22 quality-control inspections during manufacture, to assure dependable operation over a long service life.

G.E.'S BROAD RANGE OF STANDARDS HANDLES 90% OF ALL JOBS

If your company is not yet taking full advantage of the large dollar savings and other key benefits of medium transformer standardization, act today. Ask your G-E Apparatus Sales Engineer to show you how G.E.'s broad range of standard RM medium transformers can meet the large bulk of your needs, and also work efficiently with older, special transformers now on your system. General Electric Co., Schenectady, N. Y. 416-10

*Reg. Trade-mark of General Electric Company.

Progress Is Our Most Important Product

GENERAL ELECTRIC

12-Place Coincidence

Last week two utility men from distant utilities sent their forecasts on the kilowatt-hour usage for 1957. They arrived on our desk in the same mail on the same day and in a fistful of cards they were back to back—and the same number, 125,986,924,740. How's that for a 12-place coincidence?

The best "here's why" by unanimous decision of the editors was from a Southern California Edison man and we quote in part: "served by a well-organized magazine, Electrical West." Aw, pshaw.

Most optimistic forecast is 203,184,960,000. The most pessimistic is 833,585,250—and by an engineer too. Shame. Lotsa one- and two-digit errors—so watch 'em.

What people say is interesting. A utility veep says succinctly: "Nothing can stop the growth of the West." And here's one from another company: "Sales-minded executives now appear to have the most influence in our company. Thank God! I'm counting on conditions improving in other companies also."

Live Better . . . Electrically and Housepower are most frequently mentioned reasons for the West's increasing kwh consumption—darn good reasons too.

Lots of room for the broad brushers too. Received a round 125 billion—probably from the estimating department. There is a 133,333,333,333 and a 123,456,789,000.

All kinds of numbers already, but plenty of room to pick the right one out of 12 digits. Give it a try, $500 worth of stock would come in mighty handy.

To ELECTRICAL WEST's Kilowatt-hour Contest Editor

Here's My Forecast

The annual kilowatt-hour output for the 11 Western states for the year 1957 will be _____ kwh.

Here's why (in 25 words or less). _____

Name _____

Title or job _____

Company _____

Address _____

City _____

State _____

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The annual kilowatt-hour output for the 11 Western states for the year 1957 will be _____ kwh.

Here's why (in 25 words or less). _____

Name _____

Title or job _____

Company _____

Address _____

City _____

State _____

Announcing

A New Annual Load Forecasting Contest

West's Kilowatt-hour Load Forecasting Rodeo

A Chance To Put Your Brand on a $500 Block of Stock of a Western Utility

The Object — To forecast the total kilowatt-hour output of the power stations in the 11 Western states for the year 1957. Federal Power Commission figures of kilowatt-hour output will be the basis of judging the winner. Winner will be announced in the April 1958 issue of ELECTRICAL WEST.

The Contestants — Any person employed in any segment of the electrical industry in the 11 Western states, Hawaii or Alaska may submit one entry in the contest—using the attached postcard or a reasonable facsimile thereof. Entries must be postmarked not later than June 30, 1957. Employees of the McGraw-Hill company and its subsidiaries are ineligible to participate.

The Prize — ELECTRICAL WEST will award the winner, who comes closest to the actual official FPC kwh output figure, $500 worth of common stock in one of the electric companies serving an area of the 11 Western states. The electric utility whose common stock will be the prize will be determined by a drawing held at the annual Pacific Coast Electrical Assn. convention in San Francisco, Calif., May 15-17, 1957. Stock representing the prize will be purchased immediately after the drawing and held in escrow with any accrued dividends until the winner has been determined. In case of ties, the prize will be divided equally between those submitting the winning figure.

A Hint — In 1956 the official kilowatt-hour output figure for the 11 Western states was 113,501,734,000 kwh as reported by FPC.

If card is missing, use facsimile on opposite page.

It's Fun — It's a game of skill — **and a test of your optimism about Western growth. Calculate what this figure will be for 1957! It costs nothing to enter the contest. Just send in your estimate on the attached card, by letter or other postcard.**

To ELECTRICAL WEST's Kilowatt-hour Contest Editor

Here's My Forecast

The annual kilowatt-hour output for the 11 Western states for the year 1957 will be ..... kwh.

Here's why (in 25 words or less). .....

.....

.....

.....

Name .....

Title or job .....

Company .....

Address .....

City ..... State .....

Put Your Brand on $500 of Stock

Use this Card to Enter

ELECTRICAL WEST'S

—Kilowatt-Hour Rodeo—

See preceding page for full details

If card has been torn out when you receive this copy, send your entry on facsimile opposite preceding page.

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

Electrical West's Kilowatt-hour Rodeo

68 Post Street

San Francisco 4

California

News From NECA Chapters

Montana Chapter

If Montana Chapter, NECA, and the Associated Plumbing and Heating Contractors Assn. did not succeed in getting separate bid legislation through the recent legislature, NECA and the Montana State Council of Electrical Workers did get permissive laws that allow counties to adopt the National Electrical Code as a minimum. Gov. Hugo Aronson signed the bill. However, a booklet telling the advantages of separate bid legislation received wide circulation as a step toward that goal.

An unusual electrical industry meeting is being planned by Montana Chapter for June 8. It will be to honor Montana Power Co. and its officers for their outstanding work to further the cause of the electrical contracting industry. NECA will be joined by suppliers and other industry members and national speakers will present to division managers and President Jack Corette of Montana Power suitable plaques and scrolls of appreciation, according to Robert Burns, NECA chapter manager.

New Groups Likely

A line constructors chapter for the mountain states and a new branch of the Utah-Idaho Chapter in Grand Junction, Colo., are in formation and seem likely to become a reality soon, according to the informative and informal new newsletter called *Lines from U & I* now being issued monthly by Ad Woolley, chapter manager.

Joe Bollinger, NECA field representative, has been working on a four-state linemen's agreement between contractors who will make up the Mountain States Line Constructors Chapter and the local unions involved.

Bollinger and Woolley had a meeting of 14 contractors from Durango, Montrose, Rifle and Rangely in Grand Junction to consider formation of a new division. If acceptable to the group, as it appeared after the February initial meeting, the Utah-Idaho Chapter name might be changed to Intermountain Chapter. This matter was to be taken up at the April membership meeting.

In both Salt Lake City and Boise the chapter is taking an active part in the Housepower Forum programs of Intermountain Electrical Assn. and Snake River Valley Electrical Assn. respectively. Woolley has headed the wiring committee of IEA and in Boise Ferd Koch and Lysle Keith are the SRVEA committeemen organizing the forums.

Combined Annual Meeting

Tentative program for the combined annual meeting of the three Western districts of NECA, to be held in Portland at the Multnomah Hotel, May 20-22, has been outlined by Wes Grasle, District 6 vice-president, who has program and arrangements in charge.

Registration will begin at 8:30 a.m., May 20. The conference of Districts 6, 8 and 9 will begin with a luncheon at which an inspirational speaker will keynote the occasion. The business meeting following will have a report on the progress of NECA services either by President Oliver Burnett or by Paul Geary, executive vice-president. George Roscoe, director of public relations, will tell what the proposed Federal Construction Practice Act will do for electrical contractors. Roscoe will also describe the use and purpose of the regional marketing and manpower surveys NECA and IBEW are conducting.

Tuesday will have the morning devoted to separate district meetings and to a full morning session for the line constructors. At this Charles Mosely, national line constructor vice-president, has promised to come as well as William Damon, apprenticeship coordinator. Doug Ellis, Northwest Line Constructors coordinator, and E. L. Vinson, IBEW Local 125, will join them on a panel to explain line and labor problems. For those not attending the line meeting, following the district meetings, E. R. Cornish, NECA, will hold a forum on the training and technical services of NECA.

A straight from the shoulder talk on the contractor, his capital and its relation to profit will be given at the Tuesday luncheon by A. H. Gudie, president of Biddle Trade Publishing Co. The afternoon business session will be devoted to discussion of the purposes and operation of joint industry boards. George Harter, Santa Clara-San Benito Chapter manager, will introduce the subject and outline an area stabilization plan for consideration. A panel on apprenticeship and training for inside wiremen will be led by Bill Damon.

Wednesday morning's session, prior to a trip to Bonneville power project in the afternoon, will hear of "Hidden Hazards in Contracting" by William Lubursky, attorney for the Oregon-Columbia Chapter. He will caution about phoney contracts and trick clauses that make the subcontractor responsible far beyond his need to be. A banquet that night will conclude the conference.

League Program

Eugene's Electric League, now three years old, is branching out in its promotional efforts to take advantage of the industry-wide advertising and promotion. Originally chartered in 1954 by the National Adequate Wiring Bureau, its devoted officers and members from all phases of the industry have carried on a certification program in adequate wiring promotion. Recently, meetings on lighting, participation in home shows, advertising and some appliance promotions have been conducted. Alan A. Hamilton, Hamilton Electric Co., was recently re-elected president. He succeeded Jim Vitus, Vitus Electric & Supply Co., the original president and still a member of the board. Jerry Price, Price Refrigeration, is treasurer; Frank Savage of Blochley-Lane Electric Cooperative, is vice-president; and Merle Bailey, an electrical engineer for the state highway department, is secretary. There are 11 board members. Last year the league advertised once a week in local newspapers, carrying the names of all members, participated in the Operation Home Improvement program. Eugene was set up as a trial area because a good deal could be accomplished along that line. Booths in home shows were conducted by members with display boards furnished by the league. All five utilities serving in the area are members contributing 3c a meter. The territory covered includes Lane, Lynn, Benton, Polk, Coos and Douglas Counties. Membership includes every group in the industry, including utilities, distributors, appliance dealers, contractors, inspectors, home builders, architects and engineers. All four active distributors in the area are members. Meetings are held bi-monthly. The board meets each month.

New line of Alcoa heavy-duty, eliminates all loose parts

Three new extruded, parallel groove clamps handle #2 to 400MCM conductor—

Economically priced

Are your men always dropping or losing the nuts and washers from old-fashioned clamps? End fumbling loose parts. Here's the answer: Alcoa's new heavy-duty universal clamps—all loose parts have been eliminated. They can be applied without being taken apart.

These new clamps also reduce inventories. A newly developed universal groove design allows just three clamps to cover the full ACSR range from # 2 to 397.5MCM (18/1), stranded from # 2 to 400MCM. They're competitively priced heavy-duty clamps.

Top and bottom parts of the clamps are Alcoa® Aluminum Extrusions—made strong, solid, dense, with a heat-treated alloy. Being wrought metal, tapped bolt holes have strong threads. Bolts are anodized to reduce thread friction. All parts are aluminum to equalize expansion, eliminate corrosion. Grooves are specially treated and coated with No-Ox-Id.

Experience gained during a quarter century of making parallel groove clamps has been applied in designing these new heavy-duty universal clamps.

Months of extensive laboratory testing have proven these heavy-duty clamps. They have undergone 1,000 heat cycles using various conductor combinations; test current produced conductor temperatures of 200° F—without significant change in connection resistance.

Your Alcoa representative has samples of these clamps and full details. Let him show you how they can reduce your inventory, help on your connecting problems, make your men's work easier. Or write ALUMINUM COMPANY OF AMERICA, 2308-E Alcoa Building, Pittsburgh 19, Pa.

THE ALCOA HOUR—
Television's Finest Live Drama—Alternate Sunday Evenings

ALCOA ALUMINUM
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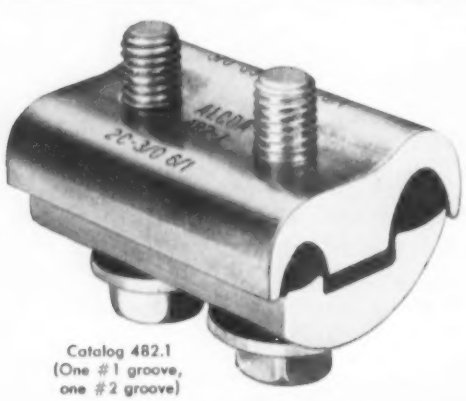
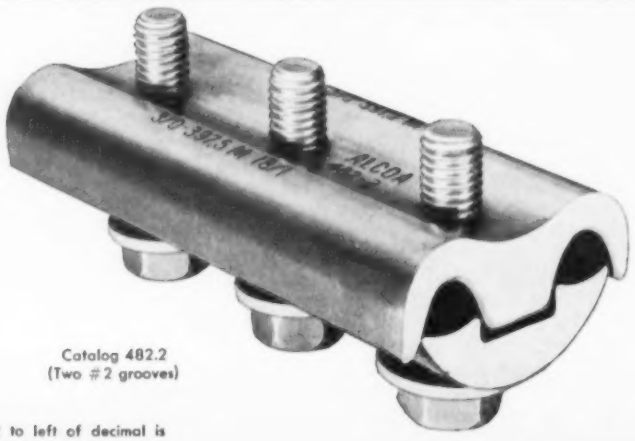
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value



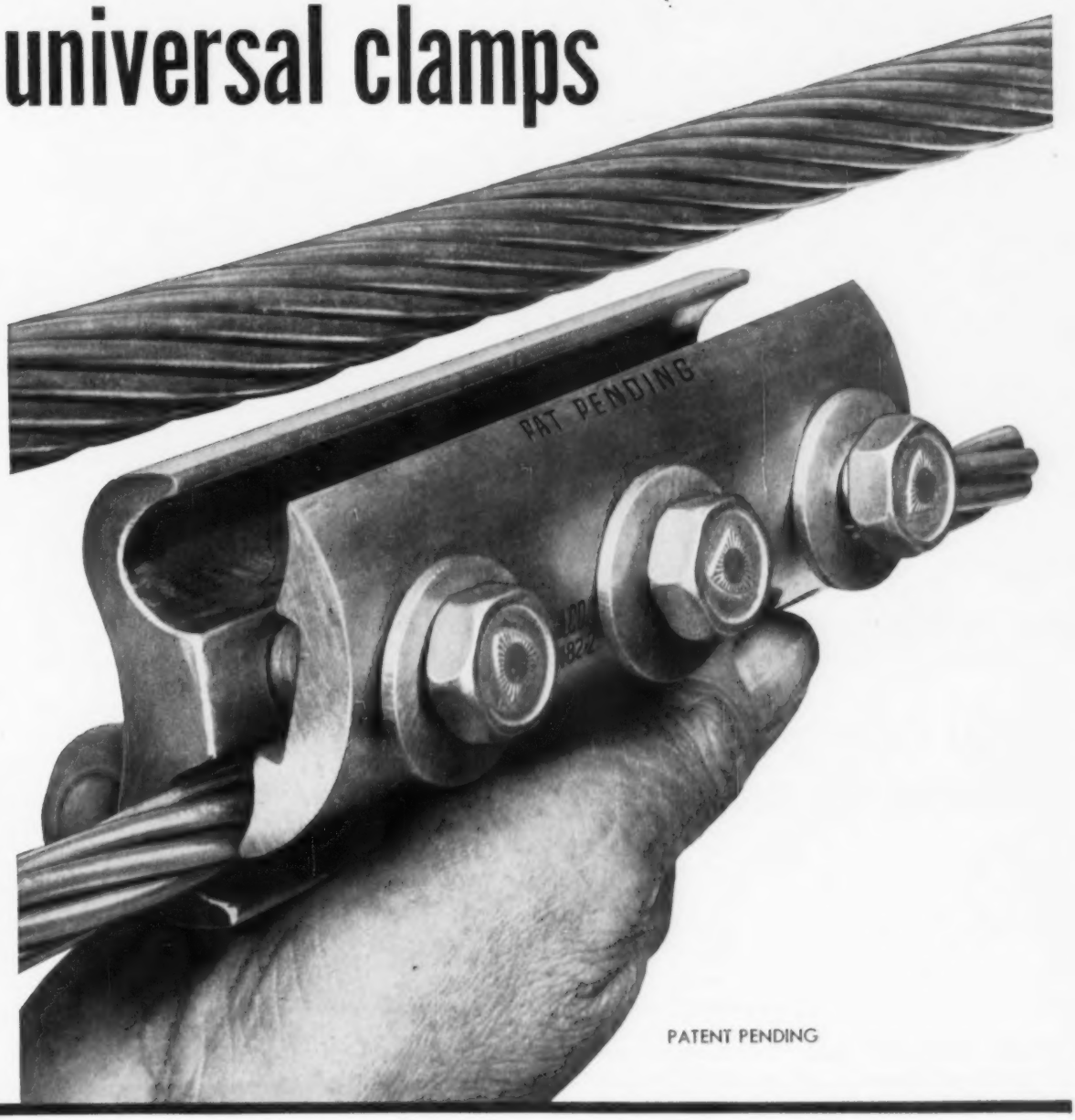
Catalog 482.1
(One #1 groove, one #2 groove)



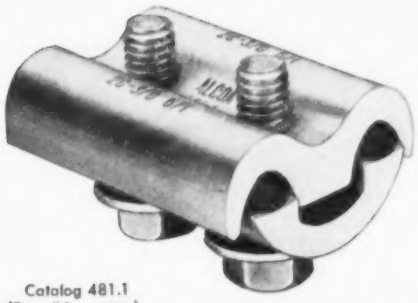
Catalog 482.2
(Two #2 grooves)

Functional catalog numbers: digit to left of decimal is number of one groove; digit to right is other groove.

universal clamps



PATENT PENDING



Catalog 481.1
(Two #1 grooves)

RANGE OF CONDUCTOR FOR EACH GROOVE SIZE

Groove Size	Dia. Min.	Range Max.	ACSR Min.	ACSR Max.	Stranded Conductor Min.	Stranded Conductor Max
1	.292	.502	2 (6/1)	3/0 (6/1)	2	3/0
2	.464	.743	3/0 (6/1)	397.5MCM (18/1)	3/0	400MCM

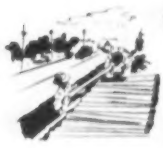
(See captions under clamps)

An 8-tier run of Soapstone OCT-O-DUCT provides a new telephone link down hard-rock Nob Hill to colorful Chinatown in San Francisco.

YOU CAN ACTUALLY SEE SOAPSTONE DUCT SAVE YOU MONEY

1 Trenchside delivery of Soapstone OCT-O-DUCT eliminates field inventory problems and makes certain your duct is at your job when you need it.

3 OCT-O-DUCT's exclusive, flat-sided design eliminates the need for expensive interlayer spacers. Duct will not roll.



2 OCT-O-DUCT's convenient 4-foot lengths can be quickly installed by 2-men crews even in narrow and deep trenches.

4 OCT-O-DUCT is connected in the trench with easy-to-apply circular couplings making possible fast, rhythmic, production-line installation.

The many time- and work-saving features of Soapstone OCT-O-DUCT and full information on the sizes, bends and accessories available from this 30-year-old Company are contained in our Catalog and Installation Manual. For your FREE copies, drop us a note on your letterhead.

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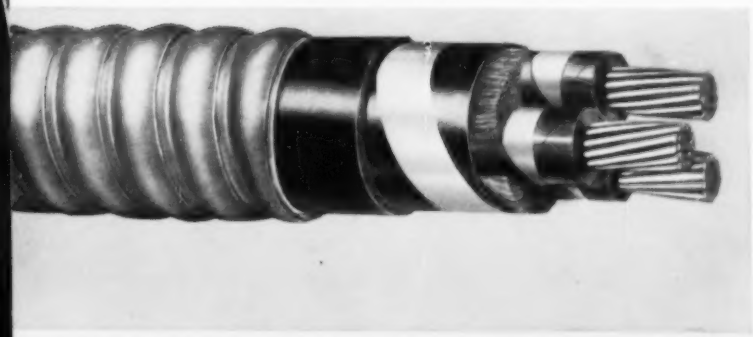
SAN FRANCISCO, LOS ANGELES, SAN DIEGO, PHOENIX, PORTLAND, SEATTLE, SPOKANE

Speed new power on old poles—cut costs
with Anaconda Duralox Interlocked-armor Cable

EXISTING POLES are utilized at well-known refinery for additional power. Cable is Anaconda's 4/0 Awg Duralox Interlocked-armor Cable.



METAL TAPE ARMOR AFFORDS HIGH PROTECTION AGAINST DAMAGE—NO CONDUIT NEEDED.

When a large Gulf Coast refinery needed additional power, the job was done *quickly* and *economically* because Duralox* could be strung on existing power-line poles—below the old lines. Neither new poles nor cross-arms were needed.

Installation time and costs are slashed with Duralox. Outdoors or in, it is readily trained around or over machinery, beams, piping and other obstructions in long, unbroken runs.

Duralox increases plant flexibility, affords easy maintenance and minimizes down time because it is generally accessible, easily relocated—100% salvageable. *Reg. U.S. Pat. Off.

NEW BULLETIN DM 5606 contains full information about Anaconda Duralox Cable. Write for your free copy today. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

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ANACONDA®
for DURALOX CABLE

FASTEST WESTERN SERVICE—At Orange, California, Anaconda's expanded, modernized mill fabricates and stocks copper and aluminum wire and cable for *every type of application*. Anaconda's Western Distributors thus can assure the fastest possible service on all West Coast needs. See Anaconda Sales Offices: Los Angeles, San Francisco, Seattle, Denver.

DURALOX CABLE is available in sizes No. 6 Awg to 750 Mcm—copper or aluminum conductors with rubber, plastic, or varnished-cloth insulation—up to 15kv. Underwriters' approved for 600 volts and 5000 volts, varnished-cloth insulation, galvanized steel armor!

NEWEST REASON WHY ALL TRANSFORMERS ARE NOT ALIKE

Molded Covers: now on trial

Unique development represents General Electric's first step toward a molded distribution transformer cover with molded-in bushings to reduce costly service trips.

The improved molding material for General Electric's experimental distribution-transformer covers and bushings is designed to prevent creep tracking—a common occurrence when conventional organic insulating materials are used in contaminated atmospheres. In the photo above Distribution Transformer Department's M. Broverman, Mgr. Design Engineering (left), and W. A. McMorris, Mgr. Advanced Product Engineering, study a completed assembly. The molded parts will be given extensive tests on utility systems this year.

The new molding material is an outgrowth of General Electric's development of molding materials resistant to arc tracking, first introduced by G.E. in the late nineteen-forties for molded instrument transformers.

Present design is only first step

The new molded bushings and covers, representing the first step in this development, utilize newly developed materials to replace steel covers and porcelain bushings. Plans for more advanced molded covers and bushings, however, are already on the drawing board and models are already in Pittsfield testing laboratories.

Next: one-piece designs

Present plans call for eventually molding the high-voltage bushing and the cover in one operation to give one-piece construction. This will reduce the number of openings into the tank.

Cost a major factor

Wide manufacture of General Electric's new molded covers and bushings must wait a few years until resin prices—now on the downswing—reach competitive levels. Then utilities can expect several benefits from G.E.'s new development.

Utilities will benefit

Units with molded covers will need fewer repaintings, since the cover, now the part most subject to weathering, will remain factory fresh. Bushings will last longer—molded materials resist damage better than porcelain. Finally, squirrels and birds will not short out units because the cover itself is an insulator.

All Transformers Are Not Alike

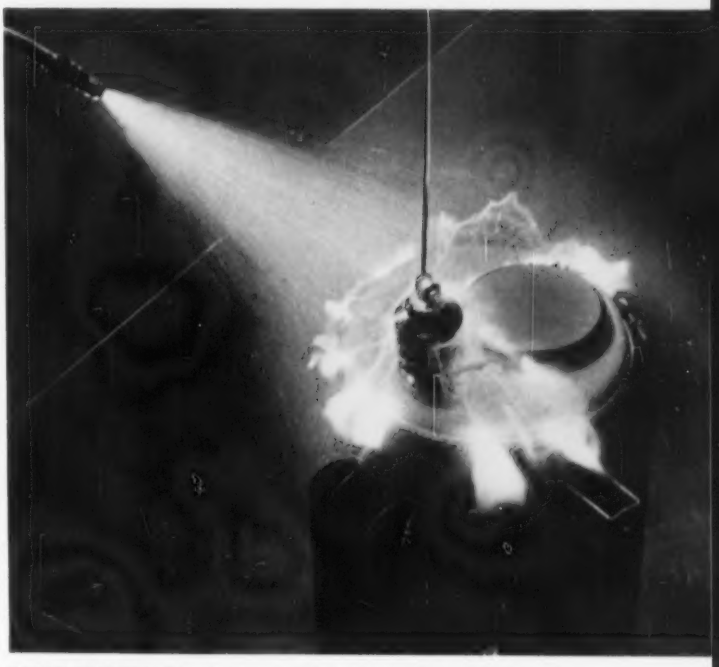
Continuous engineering development is only one advantage of General Electric distribution transformers. Others include *engineered packaging*, coast-to-coast *warehouse facilities* for fast delivery, *Formex** wire for reductions in tank size, self-protected transformers with new, improved *circuit breakers*, and many others—evidence that all transformers are *not* alike.

LIVE BETTER ELECTRICALLY

For complete information, contact your nearest G-E Apparatus Sales Office or G-E Agent—or write to Section 431-53 General Electric Company, Schenectady 5, New York.

**Reg. Trademark of General Electric Co.*

NO MORE TROUBLE WITH SQUIRRELS. New cover is made of non-tracking high-resistance compounds to prevent squirrels and birds from causing line outages, thereby reducing costly service trips.



DIELECTRIC TEST. Simulating an electrical discharge during a heavy rainstorm, test subjects molded bushing and cover to wet flashovers of 50,000 volts at 60 cycles. Despite repeated flashovers, there is no tracking and no damage to the molded materials.

Progress Is Our Most Important Product

GENERAL ELECTRIC

PROPER CIRCUIT EQUIPMENT is a "must" for any well-lighted street, and the full line manufactured by G.E. meets all system requirements.

Reliable, job-matched control equipment backs every General Electric street lighting system

In the over-all solution to your street lighting problems, the matter of proper control and protection is a major consideration. And General Electric is prepared to meet your exact needs with a full line of modern, dependable, efficient circuit equipment.

Selection of control equipment depends on such factors as type of light source, use of series or multiple circuits, whether overhead or underground wiring is available, etc. For each combination of these and many other factors, General Electric engineers have both the equipment and experience to develop control systems exactly suited to your job.

And because General Electric is a full-line street lighting manufacturer—not restricted to one type of system—the advice you get will be impartial—based on engineering and economic facts!

VISION-ENGINEERED SYSTEMS

Let G.E. help your street lighting program on a ***vision-engineered system*** basis. On every lighting project, regardless of type or size, General Electric offers you:

PROJECT RESPONSIBILITY—one source of supply for ***all*** your street lighting needs. This includes complete lines of filament, mercury, and fluorescent luminaires as well as control equipment.

COMPLETE ENGINEERING ASSISTANCE—expert start-to-finish aid from field and factory lighting specialists.

RESEARCH LEADERSHIP—the industry's newest and most complete laboratory, development, and proving facilities are located at General Electric's "Outdoor Lighting Center of the World" in Hendersonville, N. C.

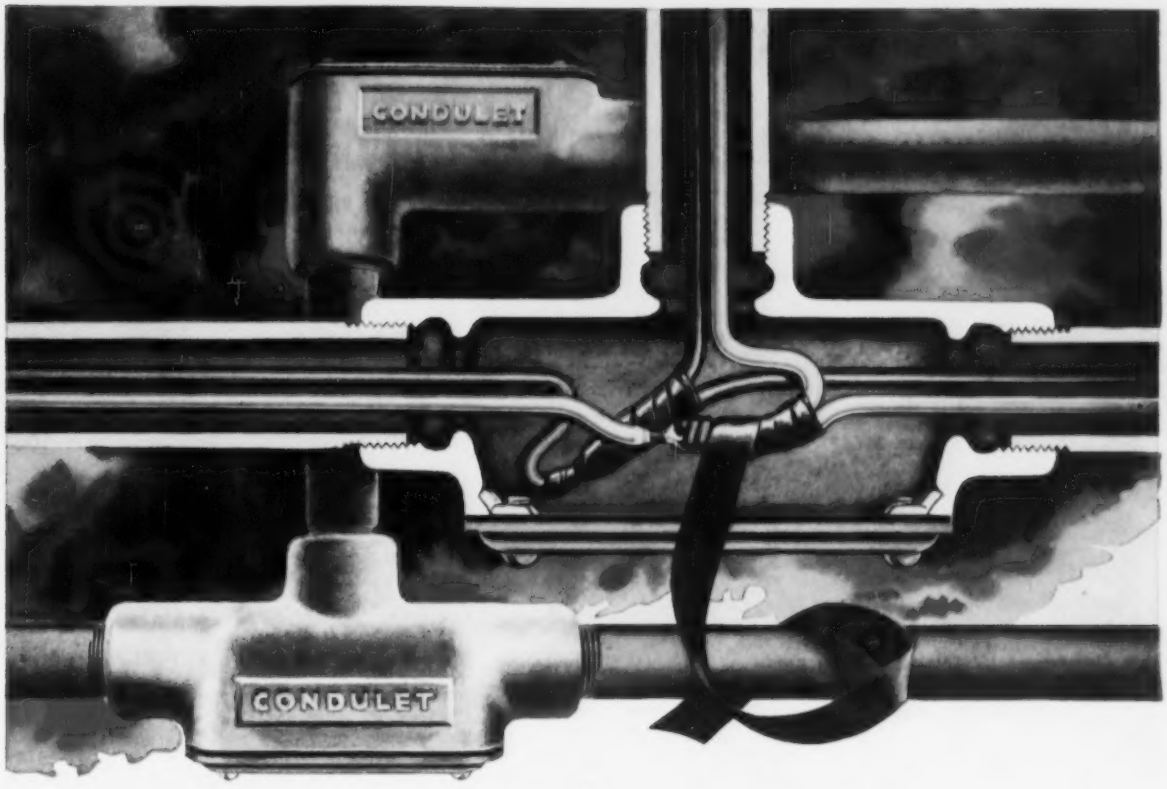
Get the full ***vision-engineered system*** story from your nearest Apparatus Sales Office or authorized agent! General Electric Co., Schenectady, N. Y.

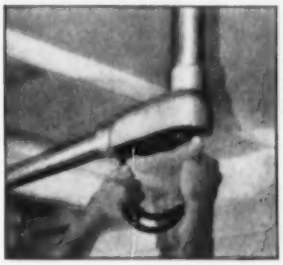
LIVE BETTER ELECTRICALLY

452-168

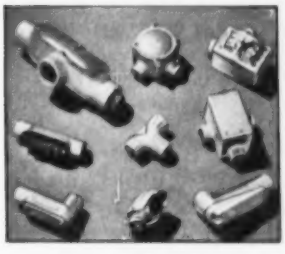
VISION-ENGINEERED STREET LIGHTING SYSTEMS

GENERAL ELECTRIC





Condulets install easily. There's room inside to do a good wiring job. No sharp edges to scrape knuckles or cut into insulation. Once installed, wiring, Condulet and conduit are there to stay—yet wiring remains easily accessible for future alterations.



Used everywhere. There is a Condulet for every need, in every conceivable industry. Each one bears the marks of superior construction. Each is *made* by craftsmen to the standards craftsmen demand!

Why electrical engineers specify

"CONDULETS... OR APPROVED EQUAL"

Electrical engineers are called upon daily to make careful choices of materials for companies who depend upon their judgment for the quality of finished work.

"Condulets or approved equal" is the common notation on specification prints everywhere. It is used to indicate *the standard of performance* demanded by the electrical engineer.

More than 15,000 items of Condulet electrical equipment offer a broad choice of explosion-proof, dust-tight or conventional construction unparalleled for safety and dependability. In *any* plant, the chances are 2 to 1 you will find Condulet junctions, switches, conduit fittings, plugs and receptacles, panelboards, pushbutton stations, motor control centers, etc. Wherever you see the name Condulet, you see the standard by which maximum performance is measured.

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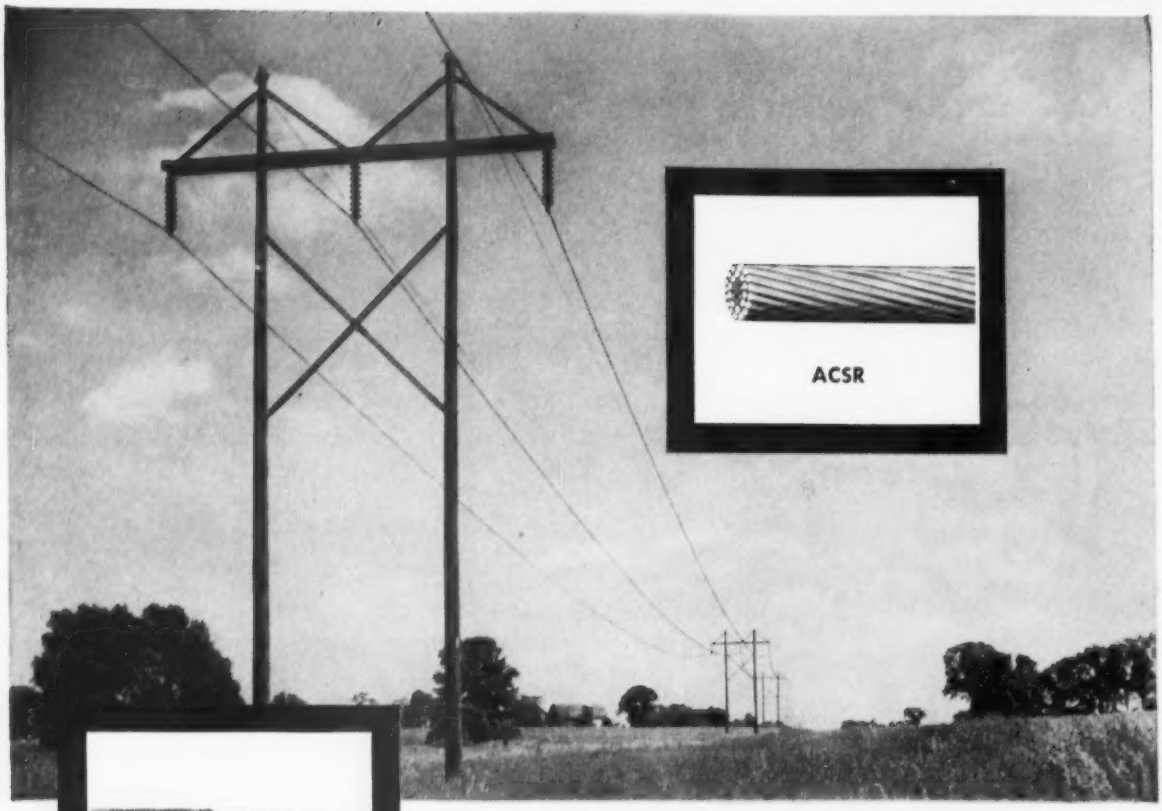
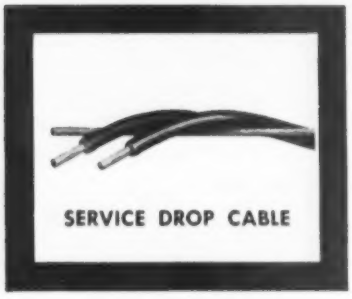


GENERAL CABLE

ALECTRAL ALUMINUM CONDUCTORS



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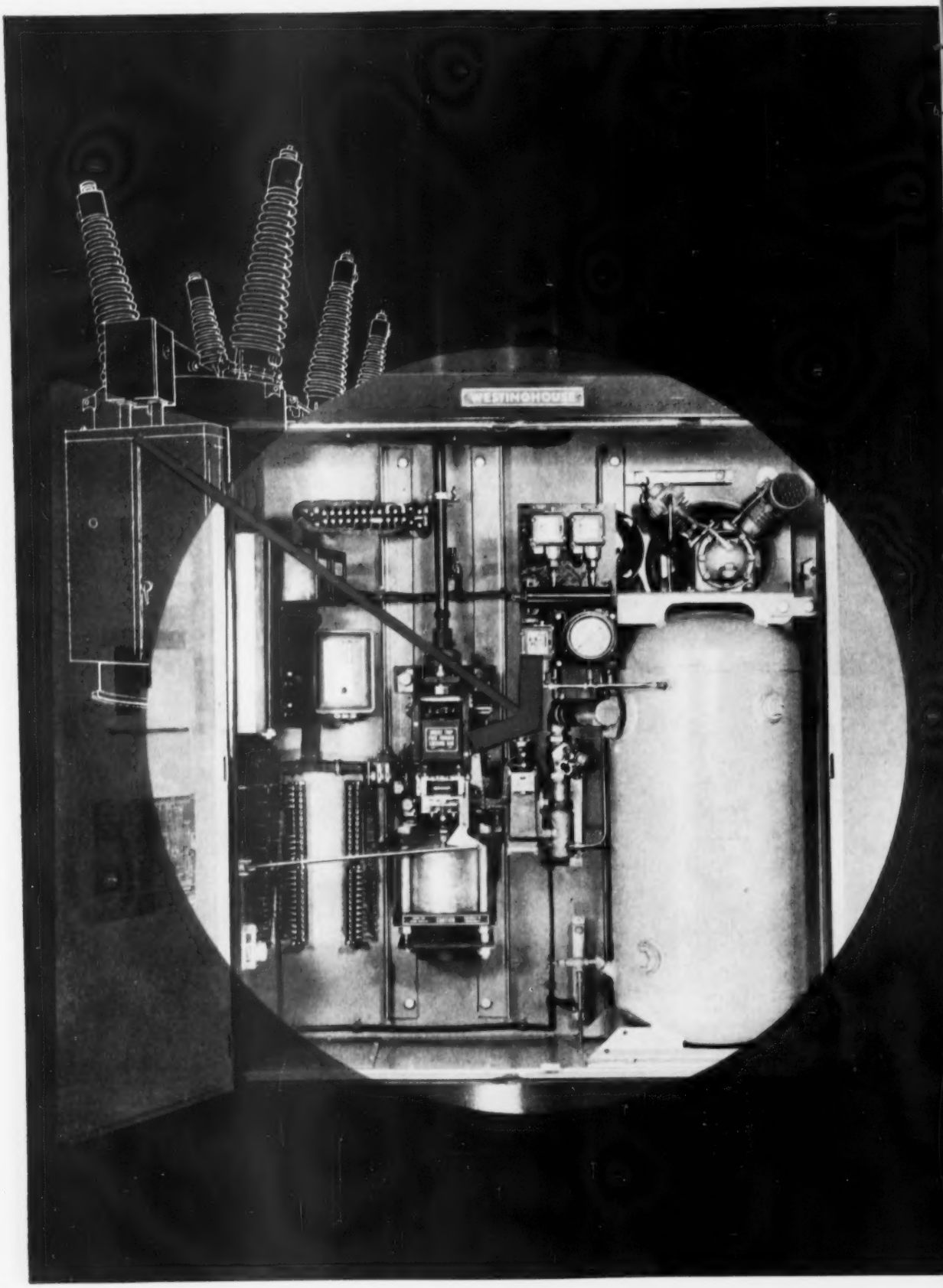
WESTINGHOUSE

Power Circuit Breaker Pneumatic Operating Mechanisms

TROUBLE FREE AND TRIP FREE, MECHANICALLY AND ELECTRICALLY

The proof of the pudding is . . . six full years of trouble-free service in the field since introduction to the industry.

Three basic models of Westinghouse pneumatic operating mechanisms, the AA-7, AA-10, AA-14, handle the full line of Westinghouse oil circuit breakers—14.4 kv, 500 mva to 345 kv, 25,000 mva.

Both mechanically and electrically trip free, the breaker will trip open in standard operating time when closed against a fault. A single mechanism operates all three poles simultaneously, eliminating system unbalance due to nonsynchronized closing. These rugged and powerful mechanisms are fast, too—reclosing in 15 or 20 cycles. Roller-bearing latches need no field adjustment for life.

Automatic selection of trip-free or non-trip-free operation results in ultra-high-speed reclosing on larger breakers.

Your Westinghouse sales representative has complete details and specifications—or you may write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-60919

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Westinghouse

THIS MONTH'S NEWS

Cowlitz Delay Costly For Tacoma City Light

Delays in construction of its Cowlitz hydroelectric project have cost Tacoma City Light an estimated $2,000,000 with $21,000 being added to this figure each month, the Tacoma City Council and Utility Board have been informed by Dean Barline, utilities director.

The $21,000 represents stand-by charges the city is paying the general contractor while the work is stopped, pending a decision from the city on how to proceed.

After being delayed by earlier court orders, work was brought to a halt late last year when the State Supreme Court ruled the city lacked authority to condemn a state fish hatchery which would be flooded by Mayfield Dam. The city tried unsuccessfully to obtain the necessary authority from the state legislature but still has hopes of negotiating purchase of the hatchery or of reversing the court's decision.

The Washington State Supreme Court has ordered the state to answer the city of Tacoma's request for a rehearing of a case which halted construction of Tacoma City Light's Cowlitz hydroelectric project late this year. The court previously ruled the city could not condemn a state hatchery which would be flooded by the reservoir behind Mayfield Dam.

Construction of a lower dam, which would leave the hatchery untouched, should be considered only as a last resort, Barline advised the council.

Barline had investigated the possibility of obtaining federal funds for the Cowlitz project, because of its flood control features, figuring that federal participation might make it easier to acquire the hatchery. He advised the council that this is not the propitious time to seek federal financial aid, however.

Barline advised against termination of the contract for construction of the dam, since such termination would require the city to pay about $2,500,000 in damages to the general contractor, plus damages which might be claimed by subcontractors.

Barline told the boards that engineering studies are being made to determine whether Mossyrock Dam, proposed for construction upstream from Mayfield Dam, might be feasible as a rock-fill structure, rather than the concrete dam originally proposed. This could reduce the estimated cost from $101,000,000 to $85,000,000 he said.

A $5,000,000 City Light bond issue would be required in the near future to replenish the Cowlitz construction fund, Barline said. Latest cost estimates place cost of the Cowlitz power at slightly more than 4 mills per kwh, which compares favorably with more recent projects approved by the FPC, said Barline.

The Cowlitz and Lewis County PUDs have expressed an interest in buying Tacoma's license for the Cowlitz project if Tacoma decides to let it go, Barline reported.

Columbia Money Available From Canadian Government

Canadian Fisheries Minister James Sinclair has revealed that the federal government is willing to finance the huge public power development of the Columbia River.

No limit was placed on the senior government's contribution to the $1 billion plan, but the one stipulation was that the development must be by a public utility, not a private power interest.

This would mean the British Columbia government would have to agree to let its provincially owned B. C. Power Commission undertake the assignment.

Sinclair said he expected "an early agreement" between Canada and the United States on downstream benefits from Columbia River development in Canada.

• **The city of Douglas**, Ariz., has approved a 25-year franchise for Arizona Public Service Co. to supply electricity and natural gas—the first such agreement in the city's history. Under contract terms, the city receives 2% of the utility's receipts from sales within Douglas. This will amount to about $10,000 a year, based on 1956 consumption.

New Transmission Lines Creating Big Intertie

Public Service Co. of Colorado is constructing two new 115,000-v transmission lines with a total length of more than 118 miles.

One of the lines will be built between Denver and Colorado Springs (52.5 miles) and the second will be between Canon City and Poncha Junction, 5 miles west of Salida (66 miles).

When completed the addition of the lines will provide a complete power connection between Denver, Colorado Springs, Pueblo, Canon City, Salida and Leadville.

PNP Snake River Plan Rates Second with FPC

A high dam at the Nez Perce site on the Snake River has received the favor of the Federal Power Commission over the Mountain Sheep and Pleasant Valley Dams proposed by Pacific Northwest Power Co.

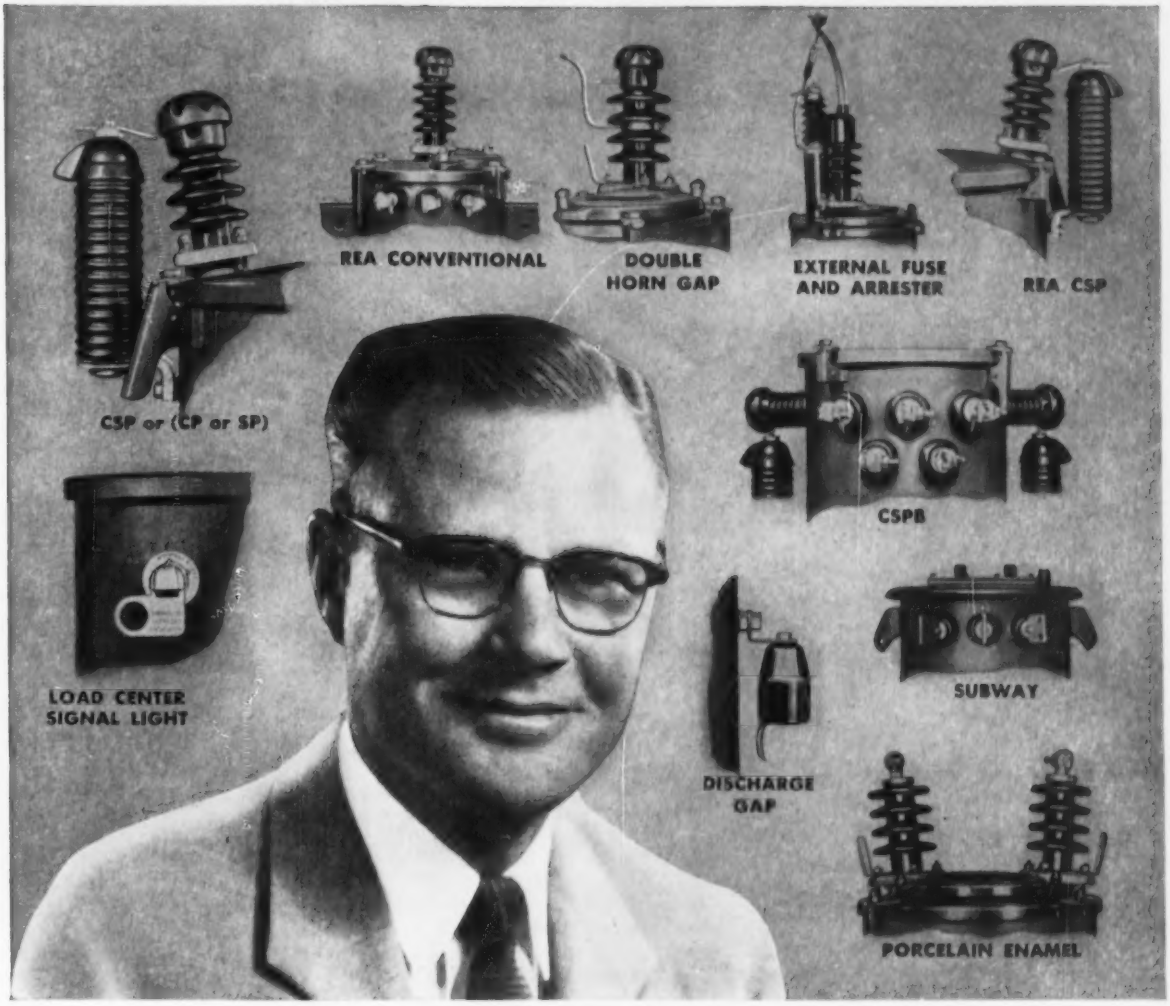
But the recommended denial of PNP's project application by FPC softened the blow somewhat by stating:

"The Nez Perce development would be economically feasible for private financing and construction, or for federal financing and construction." The FPC staff brief states that PNP should request a license for Nez Perce.

Biggest obstacle to Nez Perce in the past has been the solution of fish-passing problems related to high dams. The brief says that recent accomplishments of both the biological and engineering experts in solving the problem of passing downstream migrants "justifies confidence in their ability to solve reasonably soon a satisfactory means of passing downstream migrants at high dams such as Nez Perce."

PNP has made no comment (in mid-April) on denial of the Mountain Sheep and Pleasant Valley application.

• Utah Power & Light Co. has announced plans to construct a $1,700,000 building in Salt Lake City to house its general administrative offices. The three-story structure is to be ready for occupancy by January 1959.



KUHLMAN "Salesman of the Week" If you can identify this Kuhlman representative, and are the first one to notify Dept. SA-1, Kuhlman Electric Co., Bay City, Mich., you will receive a valuable gift.

"TAKE A LOOK AT THIS DISPLAY OF KUHLMAN DISTRIBUTION TRANSFORMERS . . .

. . . It will give you some idea of the many design variations Kuhlman offers. Conventional . . . CSP . . . REA . . . Subway . . . Banked (CSPB)—whatever your transformer needs are, Kuhlman has just the right unit for the job.

"Each design is light, compact and easy to interchange as your load grows. Most feature "Quick-Grip" insulated high voltage bushings for ratings above as well as below 5 KV. In the CSP line you have a choice of either expulsion or valve type arresters. And for special requirements you can order: over-load signal lights for conventional transformers . . . oversized bushings for increased creepage and high altitudes . . . discharge gaps for ungrounded tanks . . . porcelain finish for corrosive atmospheres . . . and many others.

"I've been able to illustrate only a few of the possibilities here. If what you need is not here, get in touch with your local Kuhlman representative. He'll give you the whole Kuhlman story."

5712b

KUHLMAN ELECTRIC COMPANY

BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA

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A pretty telephone operator is lifted bodily in an exaggerated demonstration of B.C. Electric's move to quarters at right

Moving A Utility

All office divisions and departments of British Columbia Electric Co. are serving the Vancouver public from a new 21-story headquarters. The move into the new building took 12 days and was termed the biggest single office move in Canada, and perhaps in North America.

The "Big Move" was equivalent to moving the household belongings of 2,000 families or evacuation of a small town. Amazingly enough, it was accomplished with hardly any loss of working time. Employees left their old quarters at quitting time one evening and reported to work in their new offices the following morning.

Transporting the material required the services of 60 men and 12 vans of Johnston Storage Co., and involved more than 500 trips.

Planning the operation began last July, with the movers and BCE working "to eliminate all the confusion." Johnston made "dry runs" between buildings to time everything from traffic signals to elevator speeds until every facet of the operation was synchronized. A two-way radio system linking all the vans was an important factor in timing, too.

Each office item, from desk files to delicate calculating machines, was tagged with its exact destination in the new building, including floor, department, office and floor space it would occupy.

Rising 21 stories high, the new building receiving all these people and their working equipment is an impressive and attractive feature of the Vancouver skyline. It has the shape of a truncated diamond and is sheathed with hermetically sealed double glass panels set in panels of enameled steel. The design not only gives the building a refreshingly different appearance, it also provides an optimum balance between usable floor space and maximum concentration. The shape of the building and its location avoids creating artificial canyons in the streets adjacent to it. The building proper occupies less than a third of the total land area—and that only to the third story. The upper portion of the building is an 18-story tower. This shape permits sunlight to brighten the streets below. It is capped by a 2½-story penthouse.

Taking "plenty of time" to new office

All office space is within 15 ft of windows. Careful tagging prevented chaos and the move was made without loss of records

Protection is the big reason for using breakers —so why take less than the best?

Get positive protection with Allis-Chalmers tank-per-phase construction. Today's low reactance systems with corresponding high fault currents require maximum protection. Three tanks eliminate danger of internal phase-to-phase flashover usually caused by line-to-ground fault.

Tank-per-phase construction has other advantages. Tanks are smaller, easier to handle, oil contamination is reduced, and only the faulted phase is affected.

Here's big breaker construction at no extra charge.

These breakers also feature: AEIC-NEMA standardized control wiring; two vertical breaks per phase, using time-tested *Ruptor* device; self-aligning, self-wiping tulip and bayonet contacts.

Ask for Bulletin 71B7946 for the complete story. Contact your nearby A-C office, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Ruptor is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-5145

IT PAYS TO HAVE HUBBELL GOOD CONNECTIONS

and here's another NEW product

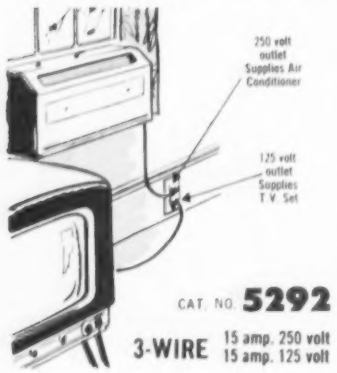
SOLD ONLY THROUGH AUTHORIZED ELECTRICAL WHOLESALERS

NOW . . . the convenience of a

COMBINATION

3-wire 15 amp. 3-wire 15 amp. GROUNDING TYPE

250 VOLT AND 125 VOLT DUPLEX RECEPTACLE



CAT. NO. 5292

3-WIRE 15 amp. 250 volt 15 amp. 125 volt

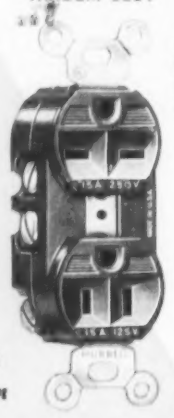
. . . for use wherever it is desirable to supply power from one duplex unit for electrical equipment requiring different voltages.

Here is the "plug-in" source of power for any 125 volt electrical device or 250 volt appliance, both supplied from the same unit at the same time. Sketch at left shows how this unit might be utilized to supply 125 volt current for a T.V. set and 250 volt current for an air conditioner. It's economical, too, because it eliminates the need for an extra box.

250 Volt

TANDEM SLOT

for standard 250 volt Grounding Caps



for standard 125 volt Grounding Caps

125 Volt

PARALLEL SLOT

- Common ground serves both 125 and 250 volt outlets.
- Available side wired or side and back wired.
- Green, hexagonal grounding screw.
- Slots for 2-wire regular or polarized caps.

HARVEY HUBBELL, INC.

HIGHEST QUALITY WIRING DEVICES • MACHINE SCREWS

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WIRING DEVICE WAREHOUSE LOCATIONS ASSURE NATIONWIDE STOCK AVAILABILITY

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Chicago 7, Illinois
37 South Sangamon Street

Los Angeles 12, California
103 North Santa Fe Avenue

San Francisco, California
1675 Hudson Avenue

Dallas 7, Texas
1111 Dragon Street

Total Regulation Cost Falls on Colorado Firms

Colorado's legislature approved and sent to Gov. Stephen McNichols a bill requiring public utilities to pay the cost of their regulation by the Colorado Public Utilities Commission.

Governor McNichols, who had urged adoption of the legislation, is expected to approve it.

At present, utilities pay 75% of the PUC's costs with the other 25% appropriated by the legislature.

Priest Rapids Under Way After April Ceremony

First concrete for Priest Rapids Dam on the Columbia River near Ephrata, Wash., was poured April 25, in a ceremony with Gov. Albert D. Rosellini turning a valve that set machinery in motion to dump the first of some 910,000 cu yd of concrete.

The dam is being built for the Grant County PUD of Ephrata by Merritt-Chapman & Scott of New York. Bedrock excavation now is now under way for the power house, within a protective cofferdam, and a second lower cofferdam 1,500 ft long has been completed in the spillway area.

PP&L Buys Timber from Washington Commission

Pacific Power & Light Co. has paid $1,319,398 to the Washington State Land Commission for an estimated 40,000,000 fbm of timber in an area to be flooded by the company's Swift River hydroelectric dam, now under construction.

The timber sale is the largest ever made by the state. The timber will be resold by the power company to logging operators, who will clear the reservoir area. Should the price of the resold timber exceed the price paid to the state by PP&L, the state will receive the difference, said Harold Sallee, Pacific Power property agent.

The $51,000,000 Swift River project includes an earth-fill dam which will be the highest in the world, measuring 510 ft from foundation to crest. It is scheduled to start production of power by the end of next year.

- The 706 booths plotted at San Francisco's huge Cow Palace for the 1957 Western Electronic Show and Convention have been fully subscribed, according to Norman H. Moore, vice-chairman.

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Triex
Non-Metallic
Sheathed Cable

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IT'S TRIEX WITH GROUND

IT'S ANOTHER *TRIANGLE FIRST!*

Triangle Triex
WITH GROUND
is now GREEN

Triangle Triex
WITHOUT GROUND
is still Silver

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SPOT THE
DIFFERENCE *at a Glance*

Distributors like *GREEN*
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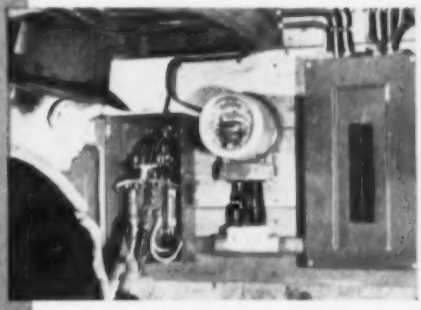

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Home owners like *GREEN*
because it tells them their homes are safely wired.

It Must Be Right
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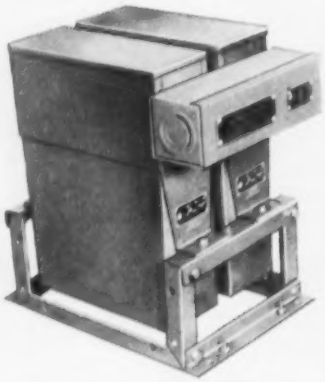

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IN INDUSTRIAL PLANTS
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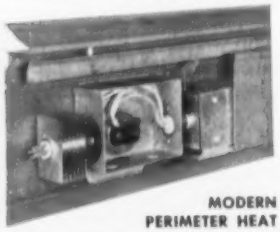
HEATSUM
ELECTRIC
BASEBOARD

(Illustration of cut-a-way section)



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PERIMETER HEAT

SAFE—Low surface temperatures and safety cutout protects furniture.
2-HEAT, AUTOMATIC CONTROL — thermostat switches from high to ½ heat autometically. (Normally operates on ½ heat.)
HIGH CAPACITY—3000 watts in 8-foot unit on high heat. Less WALL SPACE required.
BASEBOARD UNITS—available in many lengths and watteges. They are designed for a completely harmonized installation in any room. Units may be joined; blank sections available for extensions.
EASY TO INSTALL—Units attach to wall surface in new or existing buildings.
All Baseboard units have two elements and can be used with our No. 332 Thermostat for 2-heat control.

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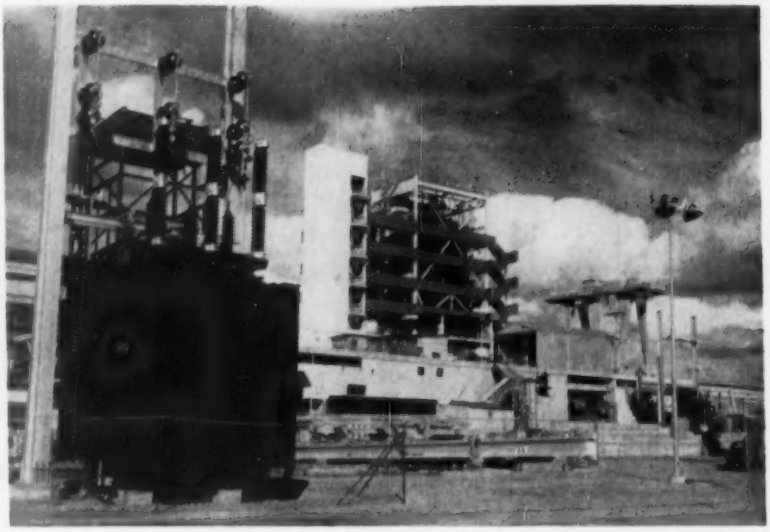


AGUA FRIA station, between Peoria and Glendale, Ariz., is now producing energy

First Agua Fria Unit Is Producing Kilowatts

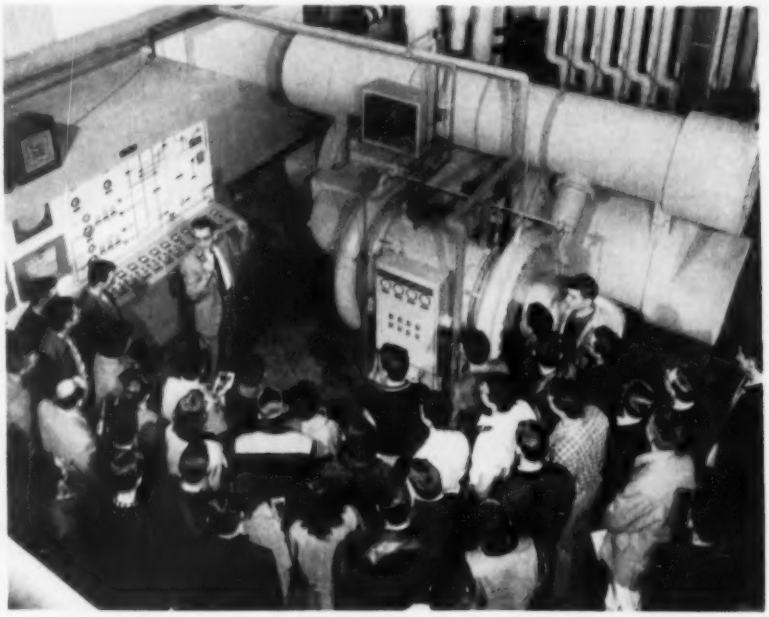
The first 100,000-kw unit of the Agua Fria steam-electric generating plant was put into commercial service April 1 by the Salt River Power District at Phoenix, Ariz.

Construction of a second 100,000-kw unit is under way and will be completed by Jan. 1

When completed, the plant will represent a $26,000,000 investment and will bring to 366,200 kw generating capacity for the Salt River District.

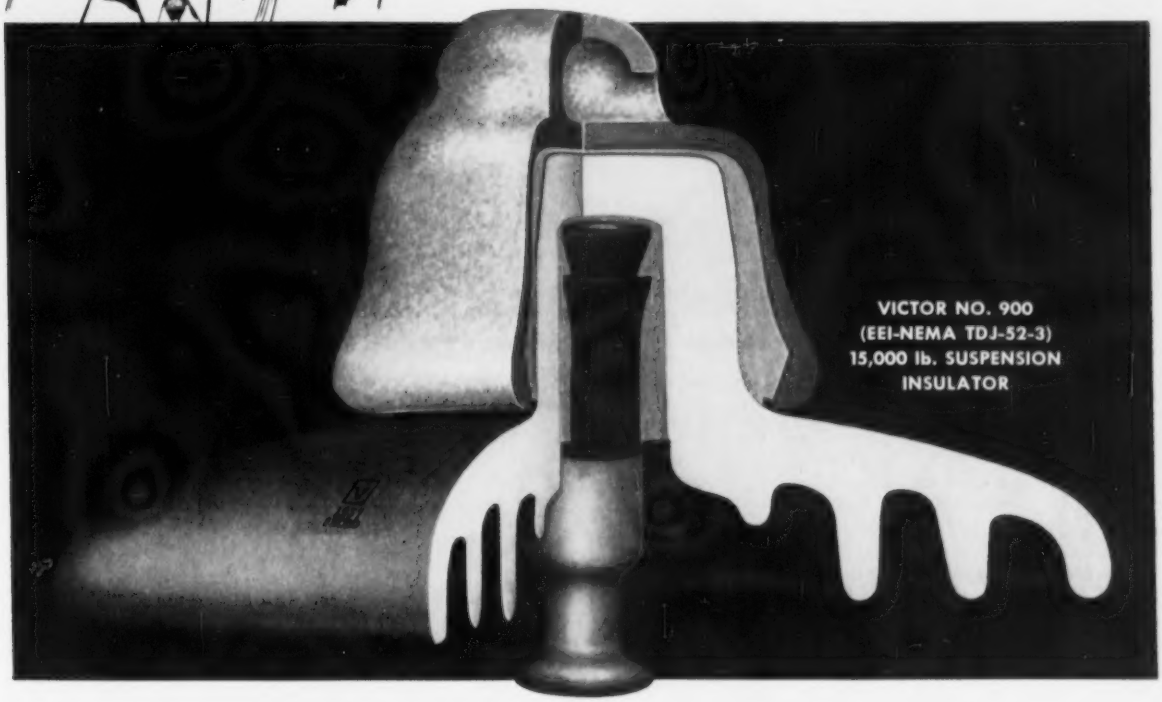
The Agua Fria installation is situated on an 80-acre tract northwest of Phoenix. The district also has an adjacent 40-acre site in reserve for installation of two more generating units in the future.

The plant was built by the Bechtel Corp., under the supervision of T. M. Morong, chief engineer, and Stanley A. Ward, general manager of the Salt River District.



STUDENTS from Spokane's high school science classes are pictured looking at the world's largest heat pump. The heat pump is used to heat and cool the service center of Washington Water Power Co. H. U. Wright explains the operation

"I'll never replace VICTOR SUSPENSIONS... I just won't live that long!"



Men who purchase insulators are enthusiastic about the service records of VICTOR Suspensions. That's because VICTOR Suspensions are laboratory designed, manufactured under rigid quality controls and tested with the industry's most modern equipment.

Take the No. 900 Insulator shown above, for example. It has rugged, rounded corrugations for maximum strength and resistance to impact. Cap and ball bolt are thick, husky and galvanized to withstand severe service. Scientifically fitted glaze gives added strength and added protection against contamination. Each insulator is proof-tested mechanically, then subjected to vigorous high frequency and 60-cycle flashover tests. When you buy VICTOR, you just can't buy better suspensions!

New . . . . . .

VICTOR CATALOG

Now ready for distribution is Victor's newest and most extensive catalog. One of the most complete in the field, it includes illustrations and data on many items being produced at VICTOR and not previously shown, up-to-date EEI-NEMA Standards, and an outline of VICTOR'S new plant, research, testing and manufacturing facilities. It's FREE! Write for *your* copy.

VICTOR INSULATORS DIVISION

I-T-E CIRCUIT BREAKER CO., INC.
VICTOR, N. Y.

Univac Personnel Come From Ranks

A cross section of Arizona Public Service Co. personnel can be found in the company's new electronic computer section.

Previous jobs of the staff which operates the company's recently installed Univac range from groundmen and surveyors to secretaries and engineers.

Shortly after the company announced it was purchasing the system, job applications were accepted from employees. Company officials were pleasantly surprised when 300 employees expressed a desire to enter the field of electronic data processing. From this number, the company was able to recruit 80% of the 40 people it takes to staff the computer operation.

Following acceptance into the program, the employees were each given an eight-week course in computer coding and programming. In addition to the coder trainees, three men were sent to Philadelphia where they took a five-month course in computer engineering. At present they are conducting a similar course in Phoenix to train an additional three men in this field. Three graduates of the coder school took additional training at the Remington Rand Service Center in Los Angeles to become operators.

The fact that there were employees at the company who had the ability to learn the complex operation of this new method of doing business has been a source of satisfaction to the management of Arizona Public Service.

Public Service is the first organization in Arizona to install a large-scale Univac system, and it is the first utility in the nation to use an electronic computer as a general tool of management. Previous utility applications have been limited to specific operations, such as revenue accounting.

The Public Service computer will be used in five fields of company operations. These are revenue accounting, vehicle accounting, plant accounting, stores accounting and pay roll.

Initial concentration has been placed on revenue accounting and the company expects its pilot program, encompassing some 7,500 customers of the company's Western Division, to be converted in April. At this time, the pilot program will be checked for accuracy by a duplicate operation under the company's present method of billing. Following this, the company's entire revenue accounting operation will be converted to Univac with the other four fields incorporated into the system shortly thereafter.

Marietta Neutz displays Univac's artistic work. It plays songs, too, they say

"Heart" of Univac is, from left, central computer, control, tape handling devices

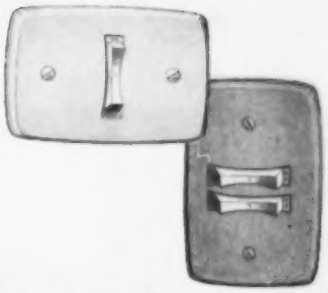
At recent open house activities, more than 5,000 Arizonans were on hand to get a close-up of the company's new data processing system.

Big Expansion Plans Proposed for Seattle

A proposed $7,500,000 program for expansion of substation and transmission line facilities has been revealed by Seattle City Light, in requesting the City Council for a $1,600,000 appropriation to start the program.

The program will include a third receiving substation in the south end of the city and a transmission line that would feed power into the station from new sources of supply now being developed on the Columbia River. The initial appropriation is expected to be used largely for the purchase of a site and rights-of-way.

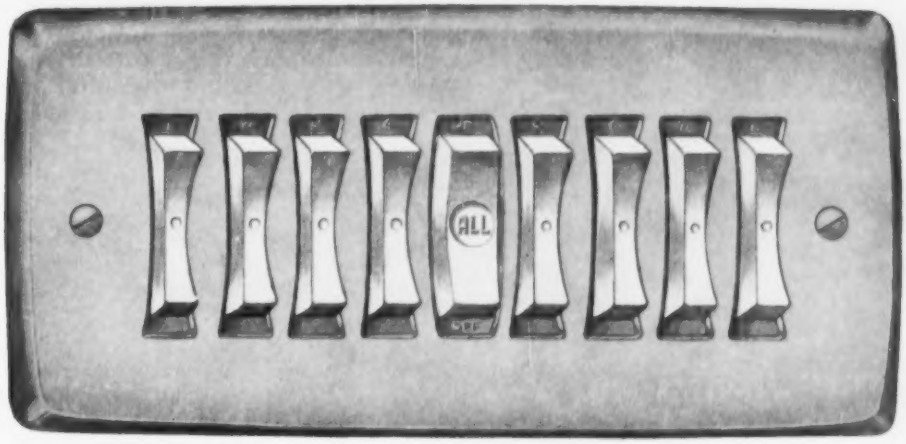
• **Navopache Electric** Cooperative Inc. has completed negotiations to purchase the Round Valley Light & Power Co. in northeastern Arizona. The co-op made the purchase out of an $880,000 REA loan. Affected are customers in Springerville, Eager and 200 rural families.



switches your customers want

And no wonder. They're not just remote-control switches, not just low-voltage switches. They're Remcon's dramatic new, Hi-Fashion Switches. Show them to your builder-customers now—and start raking in extra Remcon profit on every wiring job.

REMCON the easiest switch to install... is now the most beautiful switch of all!



master control with one-hand operation

You can control lights in 8 rooms individually or all 8 simultaneously with one switch. Definite on-off positions. Completely fool-proof operation. Color-coded for instant identification of each switch.

complete line of matching switchplates

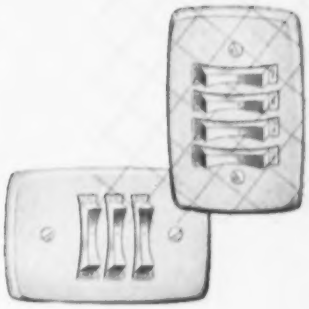
for 1, 2, 3, and 4 switches. Choice of buff or transparent wth gold insert . . . the insert can also be used as a template to cut out matching wallpaper or can be painted to match the wall. All switches glow in the dark.

exciting fashion-wise design

The look of tomorrow on the most modern switch of today. No other switch offers you the handsome contours of the REMCON plate, sweeping down towards the switches . . . or the fashion-engineered "butterfly" design of the REMCON switches themselves. No other switch adds such a gracious note to any decor.

famous, easy, remcon low-voltage installation

REMCON is the only low-voltage system with a transformer built right into the relay. It's the new, modern, simplified wiring method. Now, you have an irresistible combination for your customers—low voltage, remote-control switching with the look of tomorrow—at little more than the cost of ordinary switching!



WEST COAST REPRESENTATIVES

Allied Industries, Los Angeles
F. M. Nicholas, San Francisco
Northwestern Agency, Portland & Seattle

Pyramid Instrument Corporation, Lynbrook, N. Y. makers of the world-famous AMPROBE snap-around volt-ammeter.

Consider Enlargement of Seattle's Diablo Plant

The Seattle City Council has been asked by Paul J. Raver, City Light superintendent, for authority to spend $1,100,000 to increase the hydroelectric output of the Diablo power plant on the Skagit River.

"Engineering studies indicate we can increase capacity of the plant by 25,000 to 30,000 kw," Raver said.

The funds will be used to modify existing turbine installations. The plant's present capacity is 120,000 kw.

Bids and Contracts

• **Fluor Corp.** has been awarded a three-phase contract by the Atomic Energy Commission for improving facilities for handling of radioactive wastes at the National Reactor Testing Station near Arco, Idaho. Contract is for approximately $3,000,000.

• **J. M. Montgomery** & Co. Inc., Los Angeles, has been awarded a Bonneville Power Administration contract for construction of a 150-mva transformer addition at Franklin substation, Franklin County, Wash.

• **Pettijohn Engineering** Co., Portland, has a Bonneville contract for construction of Snohomish substation spur and transfer track extensions, foundations and site improvements. Amount is $27,164. The same company has a $234,975 contract to clear right-of-way and construct a BPA 230-kv transmission line from Oregon City to Chemawa, near Salem.

• **Alco Productions** Inc., Schnectady, N. Y., has an Alaska District Corps of Engineers design contract for an atomic energy reactor of a type suitable for providing power and heat at a military installation in Alaska. Location and size of the unit is not given.

• **Westinghouse Electric** Corp. and I-T-E Circuit Breaker Co. will supply circuit breakers and bus structures for The Dalles main generating units 9 to 14. Westinghouse has a contract for $210,600 to supply breakers and I-T-E a $334,290 contract for bus structures. Contracts are with the Portland District, Corps of Engineers.

• **P. J. Bush & Sons** will build shore cribs, steel cables and floating walkway for fingerling facilities at Lookout Point Dam. Corps of Engineers contract is for $7,794.

NEWS ABOUT PEOPLE

Ford Northrup Retires From Eugene Service

F. Ford Northrop, assistant to the superintendent of Eugene Water & Electric Board, has retired after 30 years with the utility.

As an engineer with EWEB, he has served as assistant to Superintendent Ray Boals, working principally on policy and expansion problems. Northrop was president of the Northwest Public Power Assn. for two terms in 1949-51 and previously was a member of its board of trustees. He was graduated from the University of Oregon with a degree in electrical engineering in 1912.

• **Edward M. Grogan,** realty assistant in the real estate division of the Portland District, Corps of Engineers, retired March 31 after 30 years of federal service.

• **L. M. Guibara** has been named regional conductor sales manager of Kaiser Aluminum & Chemical Sales, with headquarters at Oakland. He joined Kaiser after the purchase of the wire and cable department of U. S. Rubber Co. where he formerly was employed.

• **Harlan B. Holmes,** credited with being largely responsible for design of fish passage facilities at Bonneville Dam, has retired after 35 years as a biologist on the staff of the U. S. fish and wildlife service. He was working on fish facilities at Brownlee Dam at time of his retirement. Holmes, whose home is in Portland, said he will spend part of his time as a consultant on fish passageways for private firms.

• When Deskin Bergey went up from district manager of Pacific Power's Coos Bay district to become assistant manager in charge of the Coast division, A. J. "Pi" Moore came in from Springfield, Ore., to take Bergey's job, and E. O. Thoman went to Springfield as district manager in Moore's job.

• And here's one in Portland General Electric Co. Joe L. Williams, formerly with Allen Paine in the distribution department, has been made assistant to Vice-president Howard Arnett, and Scott Samsel, has been brought in from the Salem, Ore., office to be Paine's assistant.

• Service awards by Southern Colorado Power Co. with headquarters at Pueblo include Jeptha D. Jackson, 35 years; Leonard A. Carlson, 20; Edward D. Terlep, G. U. Cusack and William H. Burnham, all 10.

• George T. Bragg, vice-president and general manager, Pacific Power & Light Co., received his 40-year service pin at a company dinner for employees in Portland, April 1. Oldest employee in point of service honored at the dinner was Howard S. Whitbeck, construction supervisor for Oregon and Washington, who has worked 45 years for the company.

• **Henry W. Smith** has been appointed assistant general manager of British Columbia Engineering, a subsidiary of B. C. Electric Co. He was formerly assistant chief engineer of the parent company, and will be succeeded by W. Fraser Miles. G. F. Green is now executive assistant to the chief engineer.

• **George T. Loss** has been employed as safety director for PUD operations in Snohomish County and Camano Island. Loss comes with a background of utility line work and training in public relations and safety.

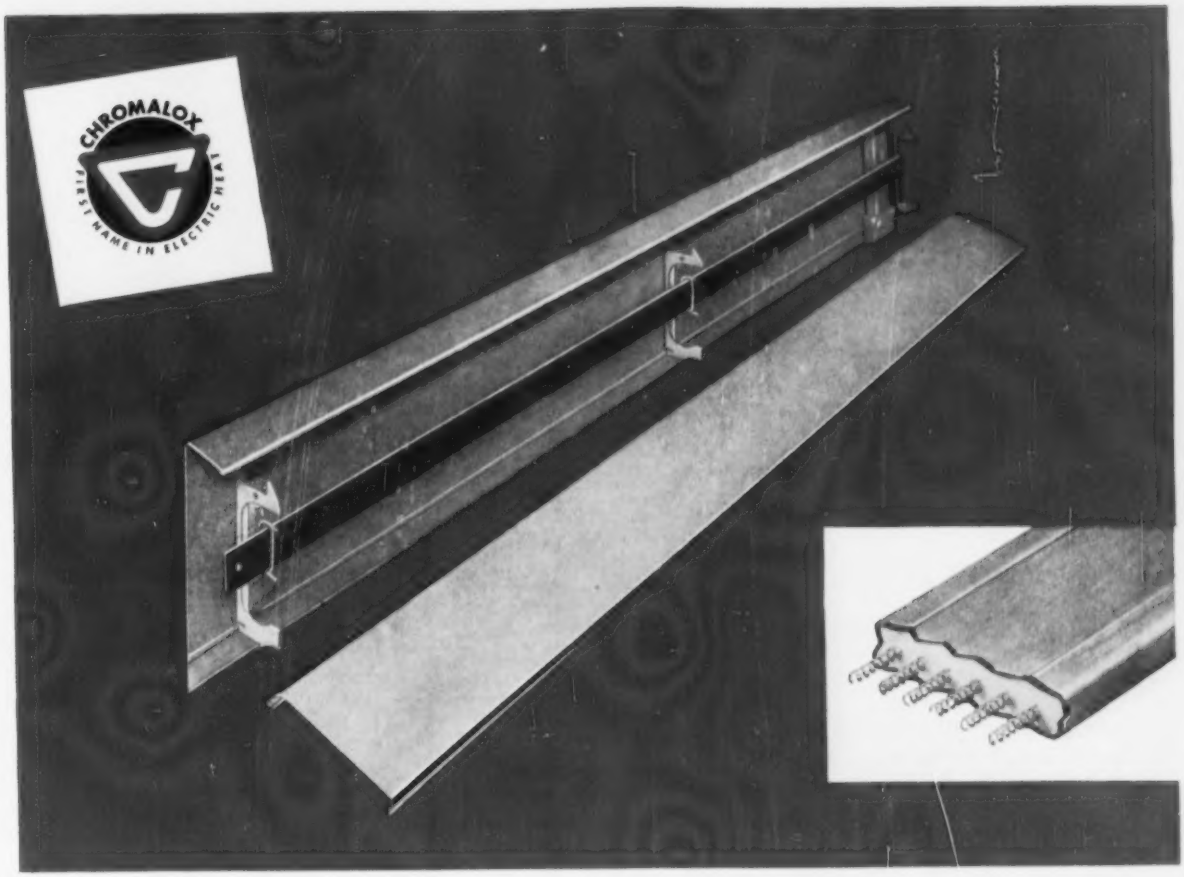
• **J. C. Wilson,** Buckeye attorney and farmer, is new member of the Arizona Power Authority, state agency responsible for distribution of Arizona's share of Colorado-River generated hydroelectric power.

PGE Engineers Get New Assignments

New assignments for six of Portland General Electric Co.'s engineering department heads have been announced by O. E. Walsh, vice-president. John Bankus, chief engineer, has been assigned special engineering studies covering such matters as possible additional steam generating plants for the company. Waldo E. Enns, formerly assistant chief engineer, becomes chief system engineer.

Other appointments were Sidney E. Caldwell to be assistant chief engineer; W. D. Smith to be chief of planning branch; P. A. Stangell to be chief electrical design branch; and Ray Palmer to be chief of structural design branch.

Walsh indicated that because of the growing importance of thermal generation facilities in this area it has been decided to make a thorough study of such facilities on the PGE system, under Bankus' direct supervision.



better electrical components

help make CHROMALOX Electric Baseboards the Quality Line

Top quality electrical components combined with smartly styled appearance are making Chromalox baseboards the standout line. The built-in quality of the electrical equipment is the result of forty years' experience in designing and building electric heating equipment—exclusively. Consider for a moment the important advantages in quality electrical components.

The heat source is a metal sheath strip heater, fully insulated for safety, and sheathed in metal for strength. It is completely shock-, break-, and moisture-proof. Its smooth finless surface cannot sag on over-voltage, and won't char dust, dirt and lint. No seasonal maintenance is required. Proved in more than 40 years of tough industrial use, it now goes to work bringing years of trouble-free performance to the American Home.

Wiring is simplicity itself. The versatile splice box can be wired from the bottom, back, or either side. Two adjacent connections are all that is necessary to connect 16 feet of baseboard heat. And Chromalox baseboards are designed to tie-in with standard surface raceway, can be connected with ordinary T wire.

Chromalox Electric Baseboard is available in four practical lengths, at 120, 208 and 240 volts. Single and two heat stages are supplied for modulated output. And there's a new "high wattage" series delivering 300 watts per lineal foot for unusual installations. It's protected with a UL listed thermal cutout.

Chromalox quality tops the field. It's backed by a no-time limit guarantee on workmanship and materials. You can get the full story simply by writing for a copy of Bulletin 800-A.

B-624

Edwin L. Wiegand Company

RESIDENTIAL HEATING DEPARTMENT

7540 Thomas Boulevard, Pittsburgh 8, Pennsylvania

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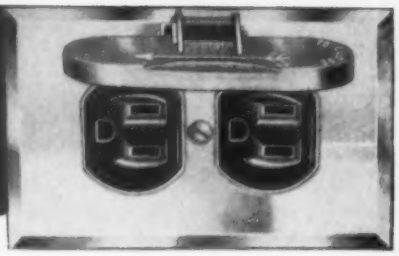
NEW! Exclusive! Different!

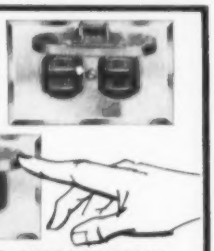


BELL SAF-T-LOK (Pat. Pend.)
Weatherproof OUTLET

FEATURING *Exclusive*
STAY OPEN
SNAP-COVER
ACTION

STOCK and SELL
FAST MOVING
BELL

STAYS OPEN IN SAFETY-LOCKED POSITION



SNAPS SHUT AUTOMATICALLY WITH SLIGHT PUSH

No. 219 SINGLE SNAP-COVER PARALLEL SLOT DUPLEX RECEPTACLE

No. 220 SINGLE SNAP-COVER 3-WIRE GROUNDING DUPLEX RECEPTACLE

Grounds metal parts of portable electrical tools, lawn mowers, etc. for safety in use with *Metallic* or *Non-Metallic* wiring systems.

...the most COMPLETE line
with EXCLUSIVE selling advantages

No. 210

Exclusive SNAP-COVER locks open for easy, one-hand insertion of plug . . . yet snaps shut at a touch for weather-proof protection. Lid does not rest on wire or plug. Can't damage insulation if cord is jerked out. *Cover cannot be loosened or pulled off.*

No. 210—ONE-GANG SAF-T-LOK SINGLE RECEPTACLE

Bell—The *Complete* Line—The *Only* Line with SAF-T-LOK SNAP-COVERS OR SCREW COVERS in 1 or 2-gang Combinations.

UL
U.L. APPROVED

No. 214 Flush Screw-Cover Duplex Receptacle

No. 216 Flush Switch (Single pole, T-rated)

No. 228 Combination Flush Switch & Snap-Cover Outlet

No. 233 Flush Switch and Duplex Screw Cover Duplex Receptacle

Make BELL your one source for the best in weather-proof and No-Shok devices, and Metal Wall Plates. *Write for Catalog and Prices today!*

BELL ELECTRIC CO.
1844 West 21st Street • Chicago 8, Ill.

Price

Byron Price Becomes Eugene Superintendent

Byron Price, assistant administrator of the Bonneville Power Administration, will become general superintendent and secretary of the Eugene Water & Electric Board July 1. He will replace Ray Boals, superintendent since 1946, who is retiring.

Price was Boals' assistant prior to his appointment to the BPA post in July 1954.

From October 1941, to June 1953, Price served with the Corps of Engineers, Portland District. He is a lieutenant colonel in the Corps of Engineers reserve.

• **John S. Anderson** is new assistant to the superintendent of power for Utah Power & Light Co. His successor as steam production engineer is J. C. Conder. In Conder's former position of superintendent of the Carbon plant is Fred W. Kemper. J. H. Hutchinson is now superintendent at Hale plant.

• **Emmett F. Buckley** is new assistant manager of the tax and insurance department of Montana Power Co. It is a new position. Edmund D. McGonigle, customer service manager of the Butte division, has new additional responsibility as administrative assistant.

• **William G. Weber,** head of the large gates and valves section of the Bureau of Reclamation's mechanical branch at Denver, has retired after 30 years with the bureau. He had been in Denver since 1931, and was designer of many of the bureau's largest and highest pressure gates and valves, including work on the Hoover Dam, Flatiron power plant, Palisades and Hungry Horse.

Recent Regulator Advances call for a Reappraisal of the old question of which to buy . . .

REGULATORS OR LTC?

by D. D. MacCarthy
Manager—Engineering
Voltage Regulator Product Section

Selection of the proper type regulation usually boils down to dollars and cents. Recent improvements in single-phase step regulators, particularly G.E.'s ML-32 with its standard Load Bonus feature (increases current capacity by 60% at ±5% regulation with no loss of short-circuit capability), have changed the economic picture from what we have known it to be in the past.

It should be noted, however, that there is no "pat" answer as to which type of regulation should be used. Application specifications may call for single-phase step regulators, LTC transformers, three-phase step regulators, or induction regulators.

The charts at the right give the new economic picture for Load Tap Changer equipment and pole-type regulators on an equipment-first-cost basis. Additional factors, such as installation costs and auxiliary equipment, might modify this picture somewhat.

Figure 1 represents a 4-kv wye system. It shows that LTC provides ±10% regulation over a broad range. However, on circuits up to 3000 kva of load, the G-E ML-32 single-phase step voltage regulator offers substantial cost advantages.

Figure 2 covers a 12- or 13-kv wye system. Here, again, the same general relationship exists.

These charts show that the General Electric ML-32 single-phase step voltage regulator usually, within its range, offers *by far* the more economical type of regulation.

For more information on regulator economics, write Section 423-24, General Electric Company, Schenectady 5, New York, or contact your G-E sales engineer or agent.

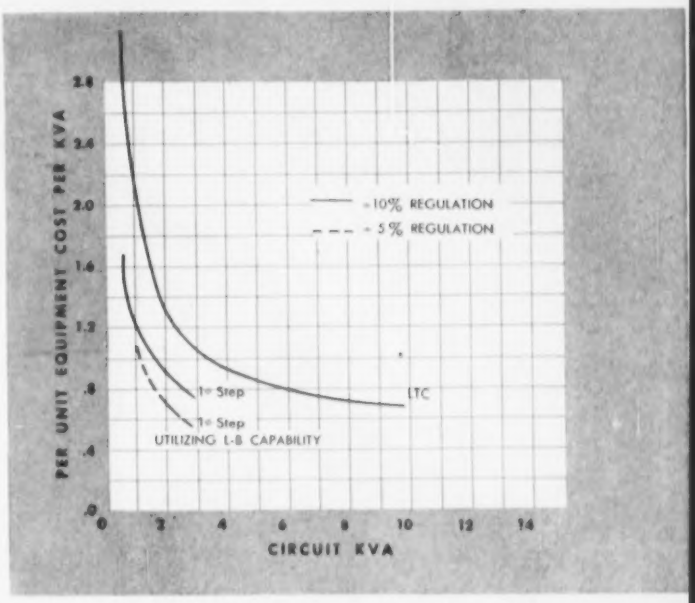


FIGURE 1. Regulating-equipment costs per kva plotted against load on a 4-kv wye-connected system.

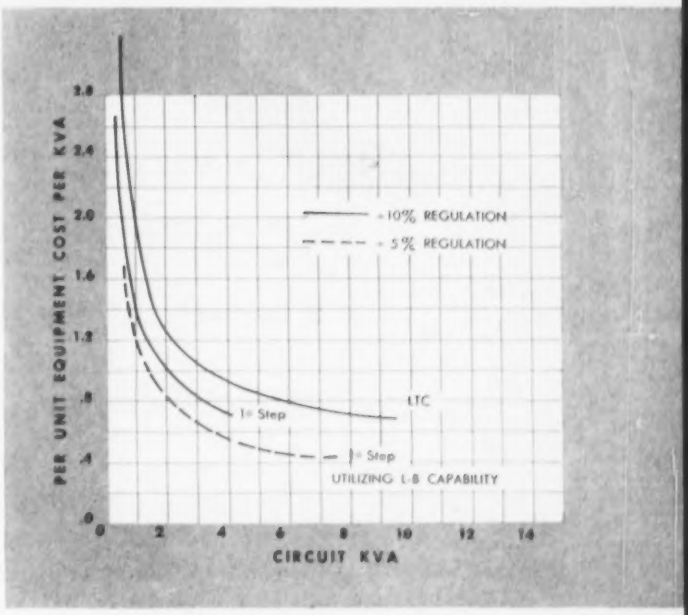


FIGURE 2. Per-unit costs for various regulating equipments on 12-kv or 13-kv wye systems.

Progress Is Our Most Important Product

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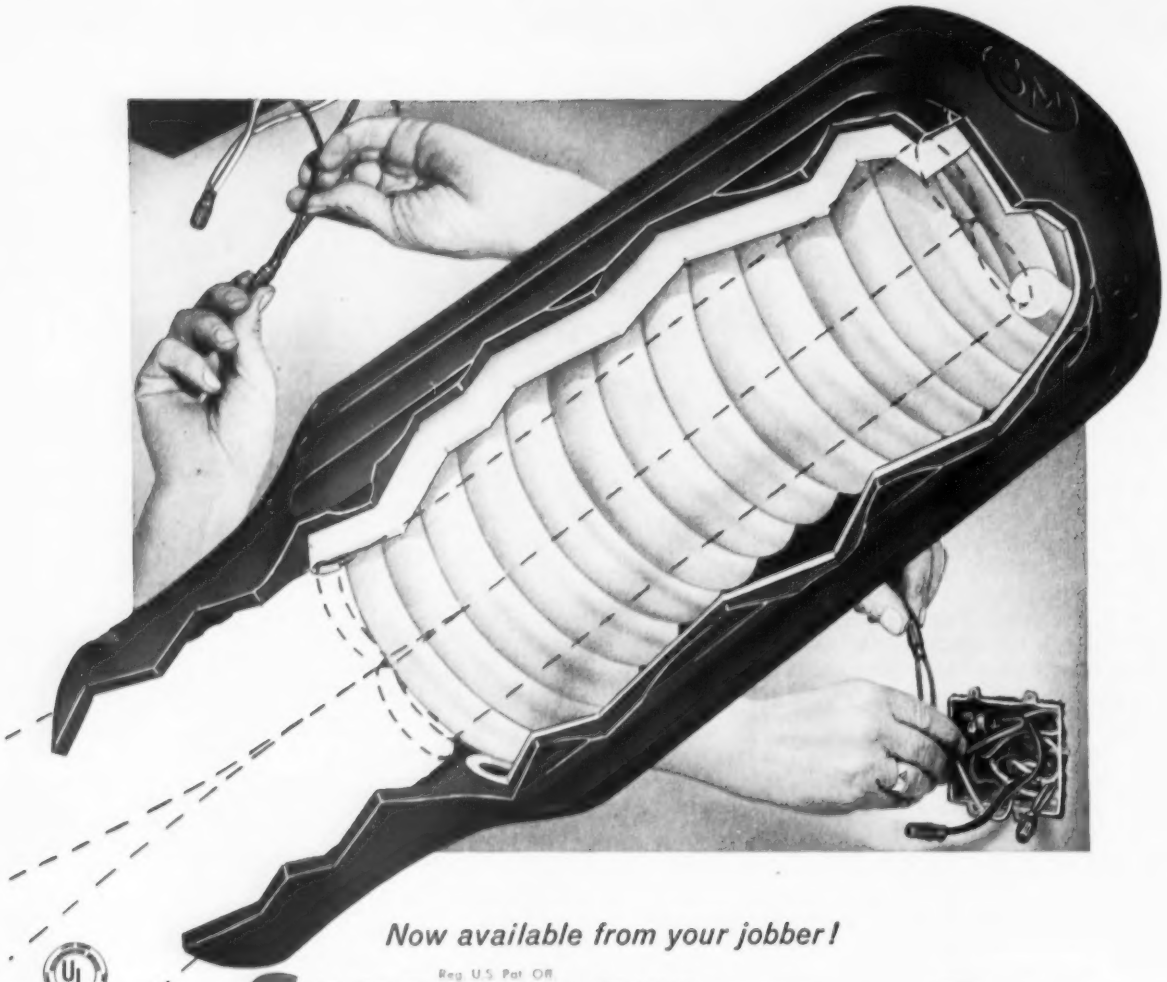

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With "live" Spring Action!

The "live" spring action of new "SCOTCHLOK" Type R Connectors holds wires in a bulldog grip. The *feel* of turning on a "SCOTCHLOK" is a sound test of its holding power. Here's everything you need for a one-step pig-tail: positive, vibration-proof connection; reinforcing steel shell; tough, pre-insulated vinyl cover; and a neat, compact splice.

FEEL THE GRIP! TRY TO PULL THEM OFF!

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The term "SCOTCHLOK" is a registered trademark of Minnesota Mining and Manufacturing Co., St. Paul 6, Minn. Export Sales Office: 99 Park Ave., New York 16, N. Y. In Canada: P. O. Box 757, London, Ontario.

PRODUCTS OF 3M COMPANY RESEARCH

New Interior Regions Bring Staff Changes

Several appointments in British Columbia Power Commission have become effective with the establishment of two interior regions in the province for administration of power district.

L. E. Wight has been named area manager of the southern interior region and S. C. Burnell area manager of the central interior.

Wight currently is district manager of the Nanaimo-Duncan district and Burnell is assistant manager of the Kamloops power district.

The new southern administrative area will embrace power districts from the Columbia Valley to Merritt, and from United States border to Williams Lake. The central interior district will comprise power districts north from Quesnel and east and west of Prince George. Headquarters will be in Vernon and Prince George.

Arnold McGillivray, district manager at Alberni, will succed Wight at Nanaimo; Tom Humble, district manager at Williams Lake will move to Kamloops as assistant district manager.

Other appointments announced included that of V. C. Smith, as district manager at Vanderhoof; C. T. Wale, district manager at Williams Lake; Larry Harper, district manager at Nakusp; Basil Gale, district manager for Columbia Valley.

• **John R. P. Powell** has been appointed executive assistant to Dr. L. B. Jack, director of budgeting and control of British Columbia Electric Co., Vancouver.

• **H. Vance Austin,** manager of the Colorado Rural Electric Assn., has resigned to go to Madison, Wis., as managing director of the Credit Union National Assn.

• **Cy Lear** is now staff assistant to James Skelton, director of sales promotion and training of British Columbia Electric Co., Vancouver.

• Percy F. Kolb, chief accountant for the Helena division of Montana Power, has retired, and his place has been taken by William T. Campbell from Butte, according to H. K. Dickinson, Helena division manager.

• **Charles H. Heltzel,** formerly Oregon Public Utilities Commissioner, has joined the Portland legal firm of Smith, Gray, Hill & Rogers and will represent the firm in Washington, D. C. Pacific Power & Light Co. is the firm's principal client.

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offer you
3-WAY STRENGTH
on every job!

1 Strength in METAL
Non-rusting aluminum plus a special blending of alloys for greater malleability and resistance to shock and strain far beyond on-the-job needs.

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Carefully engineered for maximum performance, designed to utilize inherent metal-strength to the fullest.

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San Francisco	714 Harrison Street
Seattle	4130 First Ave. So.
Denver	1073 Galapago
Kansas City, Mo.	616 W. 26th Street

Canadian Representatives

Vancouver 9, B. C.	551 W. 8th Ave.
Edmonton, Alberta	7608 88th Ave.

Killark
ELECTRIC MANUFACTURING COMPANY
3940 EASTON • ST. LOUIS 13, MO.

Galbraith

• William A. Pearl, Bonneville administrator, has announced the appointment of W. A. Galbraith, of Olympia, Wash., as special assistant. He will periodically evaluate BPA policies as they concern customer relationships, utility groups, the public interest and resource planning, said Pearl. Galbraith was Washington state director of the department of conservation and development.

• **Clayton L. Holm** is residential consultant and Harvey Shahan supervisor for commercial and residential development in business department assignments by the Salt River Power District.

• **William L. Kimsey** will fill a new position created by Arizona Public Service Co. He is now market development manager and has charge of the company's sales and marketing program.

• **Russell M. Smith,** former West Coast district sales manager of the Tomic Sales & Engineering Co., has been appointed vice-president in charge of sales for the company. Company headquarters are in Detroit.

• **William M. Jack,** Cheyenne investment broker and former state auditor, has been appointed to a six-year term on the Wyoming Public Service Commission.

• **Frederick Rothermel** of Phoenix has been appointed industrial development consultant for Arizona Public Service to assist A. V. K. Babcock, area development manager for the utility. Rothermel is a native Pennsylvanian and has been with Public Service since 1953 as an analyst in the rate department.

• **George W. O'Connor,** head of the O'Connor Construction Co. of Fromberg and former state legislator from Carbon County, has joined the Montana Power Co. as executive assistant.

Deaths

• **J. C. Williams,** 66, for many years a salesman with Westinghouse Electric Supply Co., died recently in Piedmont, Calif. He had retired Jan. 1, 1956, after 35 years with Wesco, and then joined Gray Electric where he was employed at the time of his death.

• **Albert H. Rosenberg,** 71, founder of the New State Electric Co. at Phoenix, died March 29. A native Arizonan, he was graduated from Stanford University in 1908 as an electrical engineer and worked on construction of Roosevelt Dam in that capacity. He established New State in 1910.

• **William A. Reef,** 87, retired department head for Public Service Co. of Colorado, died April 1 at his Denver residence. Reef organized the company's department of corporate documents in 1923 and headed it until his retirement in 1946. He was a graduate of Southern Illinois University.

• **William N. Doyle,** 82, of Friday Harbor, Wash., a retired engineer for Puget Sound Power & Light Co., died March 21. He was employed by the power company for 30 years before blindness forced his retirement.

• **Fredrick William Walters,** 41, national sales manager for Sierra Electric Corp., Gardena, Calif., died March 1, at his home in the Palos Verdes section of Los Angeles. Walters had served as Sierra sales manager since early 1949. He was a member of the Electrical Club of Los Angeles, and National Electrical Manufacturers Assn.

• **Barney Jankelson,** who was president of Incandescent Supply Co., San Francisco, until his retirement due to illness in 1955, died March 25. He had started the original Incandescent Supply Co. in Chicago in 1910, which he headed until 1931, when he disposed of his interests and came to California.

• **Cathrae M. Laffoon,** 68, retired Westinghouse executive and AIEE engineer of the year in 1950, died April 5 in El Cajon, Calif. He was former manager of the generator engineering department of the company at East Pittsburgh, Pa.

• **Bernard Ray Fritz,** 66, Richmond, Calif., electrical contractor, died in March at an Oakland hospital.

NOTES ON THE TRADE

Bonine

• **Marvin C. Bonine** has been appointed division manager of the Pacific Switchgear division of Federal Pacific Electric Co. He was formerly plant manager for Yale & Towne Mfg. Corp., Salem, Va., and first joined FPE as manufacturing manager in San Francisco last year.

• **Among some 360** sales leaders of IBM's Western sales districts attending two conventions of the Hundred Percent Club were K. M. Larsen, San Francisco data processing sales representative serving PG and E, and Sam Fitzpatrick, Western regional public utilities representative. Both attended the Coronado convention.

• **L. V. Walker Co.** has been named sales representative in the San Francisco territory of Pittsburgh Reflector Co. The company, headed by Leonard V. Walker, will handle the complete line of Pittsburgh products.

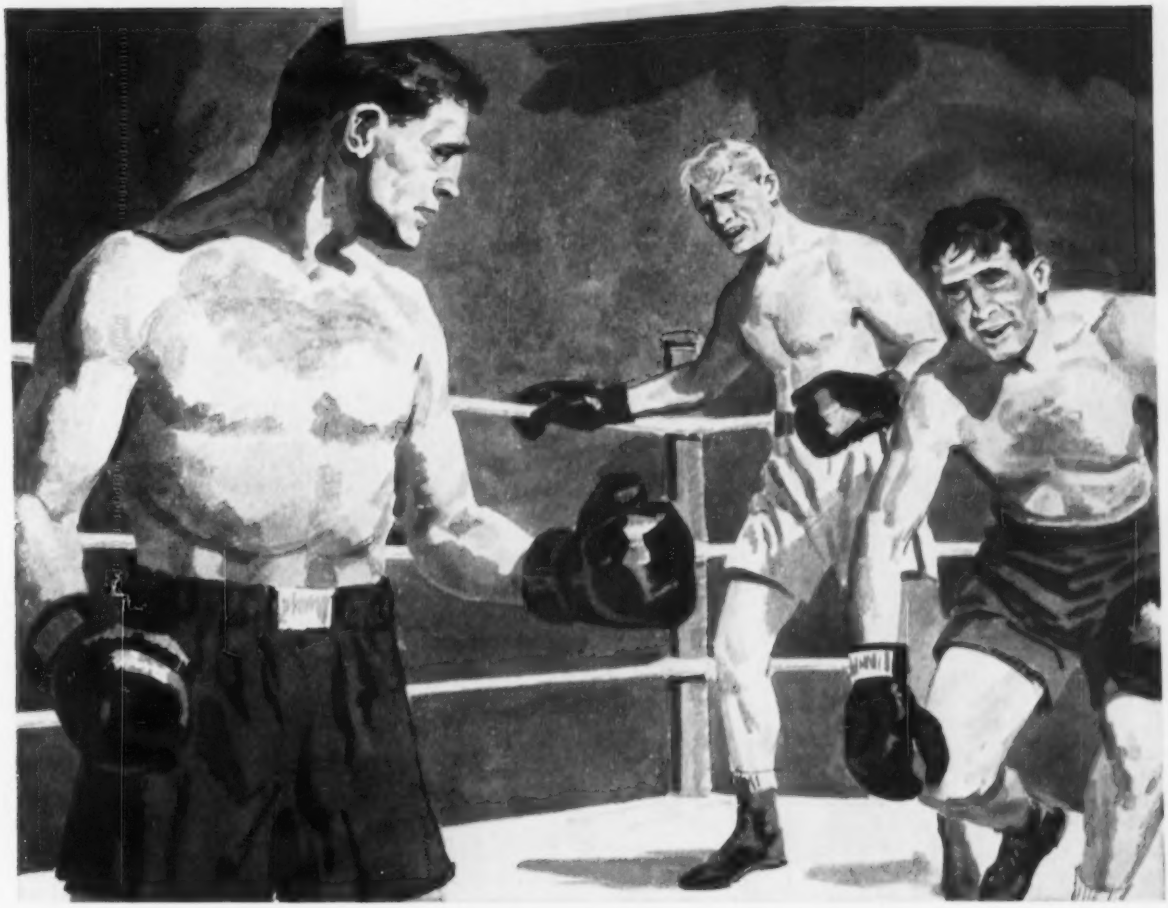
• **C. E. Riggs** Inc., Portland, is now a distributor for Dow Corning silicone greases, compounds and other lubricants.

• **Jack W. Davis** has been appointed Rocky Mountain regional sales manager of Johns-Manville pipe division. He headquarters in Lakewood, Colo., and will cover Colorado, Idaho, New Mexico and Wyoming.

• **General Electric Supply Co.** has opened a new branch operation at 7340 Fulton Ave., North Hollywood, Calif. Charles G. Collier is store manager of the new facility.

SHELL

A worth-while story about
Shell men, techniques and
SHELL TURBO OIL



Marathon fight enters 17th year
—Champ still going strong

THERE'S A special kind of fight going on every day in a turbine—a fight against rust and oxidation.

In several large installations, a single charge of Shell Turbo Oil has been fighting these trouble-makers for *seventeen years*—with little change in properties and no sign of turbine trouble due to rust or sludge deposits.

Actual use tests like this prove: Because Shell Turbo *contains some of the most effective inhibitors known*, it stops turbine hazards long after ordinary oils fail.

Chances are Shell Turbo or another Shell product is the right answer to one of your lubrication problems. These fine products are developed by Shell Research—a 1500-man team strong on lubrication experience.

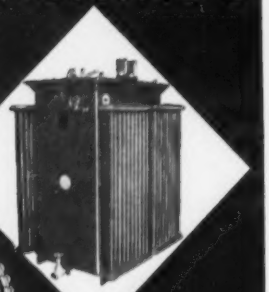
Why not put that experience to work in your plant, this week?

DID MACY'S TELL GIMBELS

about those wonderful MARCUS transformers

We don't know . . . but both of these nationally famous department stores use Marcus Transformers for power and lighting distribution.

Marcus "Mark of Quality" transformers GUARANTEE trouble-free service and safe, dependable operation. For bigger profits and greater customer satisfaction, use MARCUS for your next installation.



MARCUS TRANSFORMER CO., Inc.
RAHWAY, NEW JERSEY

Representatives in Principal Cities

"Mark of Quality"

A COMPLETE LINE OF DRY TYPE AND LIQUID-FILLED TRANSFORMERS THRU 5000 KVA

Preferred by Leading Manufacturers . . . and Best for YOUR Customers!

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RUBBER • NEOPRENE • PLASTIC

Flexible Cords

In convenient lengths on smart lithographed metal spools for fast over-counter action. For absolute uniformity, superior electrical qualities and ultimate economy, sell 'em CORNISH . . . the BEST!

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For home, farm and industry now available in COLOR. Engineered and produced in modern plants . . . the BLUE CHIPS of industry, worth a push for PROFIT.

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HOW TO ESTIMATE THE COST of any electrical job

This book is packed with time-saving methods that help you streamline your estimating procedures—give you the knowledge that means safer and more dependable bids. Covers everything from the selection and training of electrical estimators and the proper use of estimating tools to preparation of final bid sheets.

ELECTRICAL ESTIMATING

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Covers . . .
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- estimating tools and their proper use
- studying plans and specifications
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CLEAR explanations, plus sample estimates and guides, show you how to handle lighting and power branch wiring—distribution equipment—overhead and markups—estimating special projects and residential wiring. Time studies and preparation of labor cost units are examined in detail.

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Dewar

• **H. A. Dewar** has been appointed Seattle district manager for Maydwell & Hartzell. He leaves the Portland office of the company to take the new position.

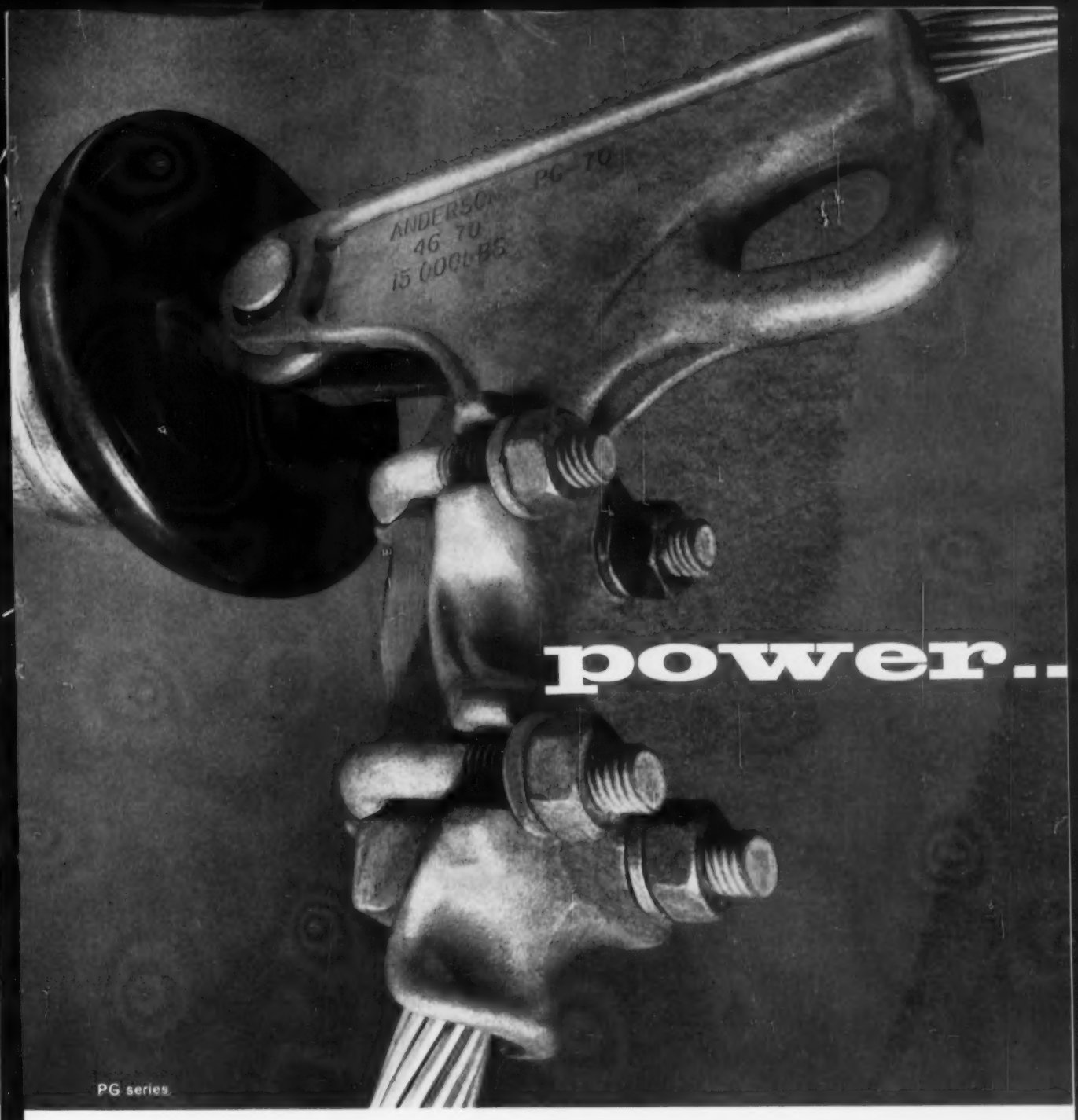
• **W. L. Clark** has been promoted from senior staff engineer to director of engineering of California Packing, San Francisco.

• **A Pacific coast** branch of the Westinghouse industrial heating division has been opened in San Francisco. The branch will design, manufacture and sell gas and electric industrial heating systems. R. R. LaPelle is manager of the new branch, and Wallace B. Dugan is design engineer. In Los Angeles are Donald P. Hoover, industrial heating product engineer; C. Kenneth Massey, sales engineer, and William A. Emerson, induction heating engineer.

• **Joseph Shapiro** has been elected president of Supreme Lighting Co., Los Angeles. He has served as vice-president and general manager for the past 10 years, and is a member of PCEA, IES and several civic and charity organizations.

• **J. Stuart Woolley** has been named purchasing agent of the new industrial fork lift plant of Yale & Towne Mfg. Co. at San Leandro.

• **The Palto Alto** plant of Preformed Line Products Co., Cleveland, is now under the supervision of Albert Bonds, who was recently made vice-president of operations for the company. He will also be in charge of the Cleveland plant, and supervises both purchasing and production. Jon R. Ruhlman, new vice-president of research and engineering, was a recent PCEA speaker.



PG series

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Anderson's Pistol Grip aluminum dead end clamps give top performance on distribution and sub-transmission systems. Snub Seat design assures high holding power. Strong, lightweight aluminum construction reduces cable damage, and one-piece keeper assembly speeds installation.

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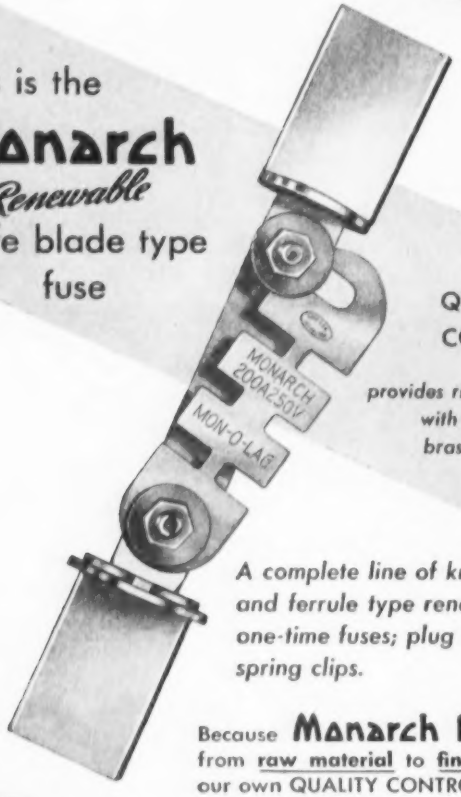
Aluminum & Bronze Power Connectors • Clamps • Fittings • Accessories for SUBSTATION • TRANSMISSION • DISTRIBUTION

with one dependable quality

Monarch
RENEWABLE FUSES

are saving
industry MONEY!

This is the
Monarch
Renewable
knife blade type
fuse



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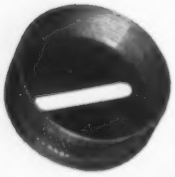
provides rigid blade alignment with machine threaded brass inserts—easier to renew

A complete line of knife blade and ferrule type renewable and one-time fuses; plug fuses and spring clips.

Because **Monarch Fuses** are made from **raw material** to **final inspection** under our own QUALITY CONTROL — we are able to make strong claims and GUARANTEE long service.



Specify **Monarch Fuses**
for improved
FUSErvice

Monarch
ELECTRIC CORPORATION
Jamestown, New York

Lown

Mowery

• **Hubbard** & Co. announces the appointments of Virgil E. Lown as district manager at Salt Lake City, and A. C. Mowery as district manager at Portland. Lown joined the company at Oakland in 1950 and Mowery in 1954.

• **George B. Mackey,** Pacific Coast regional manager of the Westinghouse lamp division, has received a service award for 35 years with the company.

• **Friends of M. F. Beisber,** San Francisco representative for Line Material Industries for several years, will be interested to know he is now marketing consultant of the new McGraw-Edison Co. He will continue to serve as director of market research and distribution for Line Material Industries.

• **Refrigeration Distributors Corp.** held open house recently in its new quarters at W. 13th S., Salt Lake City. Ted R. Brown is manager.

• **General Electric's** construction materials division has two new district representatives in the Pacific district. Willard E. Norwood will work from the Los Angeles office and Otis A. Taylor from the San Francisco office. Both will handle wire, cable, wiring device and conduit products.

• **John McDowell** is promoted to plant controller and John Dys to service manager of Hubbard & Co.'s Oakland plant.

• **O. Y. Powell** is a new sales engineer with General Electric's apparatus sales division in Denver. W. E. Holdsworth is appointed inside office salesman in the local office there.

• **Reorganization** of General Electric's lamp division warehousing and field service section has led to establishment of a Western service region with headquarters in Oakland. Robert G. Weiland is manager.

• **Stevens Sales Co.**, Salt Lake City, will represent BullDog Electric and Young Electric, a BullDog distributor. Jack Lowder, owner of Stevens Sales Co., said his Square D line is being taken over by Square D's own office in Salt Lake City. Stevens Sales Co. is at 1482 Major.

Ridgeway

• **Lou Ridgeway**, lighting division field representative for Sylvania Electric Products in San Diego, has transferred to Sylvania's international division, and will be located in Havana, Cuba. He will be resident sales manager for all products.

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a Brand New Concept

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of Fiber Glass Reinforced Plastic

The *newest* product offered to the electrical industry . . . Porcelain Products "FRP" outlet boxes provide the *EXTRAS* . . . not found in any other type. Molded of fiber glass reinforced polyester, with standard round knock-out holes and non-metalic clamps (if desired), it combines the strength and lasting qualities of steel . . . with the desirable electrical properties of plastic. Porcelain Products "FRP" outlet boxes are *ideal* for replacement or new construction . . . especially where moisture or corrosive atmosphere is present. Contact your electrical wholesaler or write direct for further information and catalogs.

FARM BUILDINGS

HOMES

INDUSTRIAL

WHEREVER MOISTURE OR CORROSIVE ATMOSPHERE IS PRESENT

ELECTRICAL PORCELAIN SINCE 1894

63 years

Porcelain Products, Inc.

PP INC.

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A NAME TO REMEMBER

...for transformers that stay in service

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POWER & DISTRIBUTION TRANSFORMERS

OIL FILLED • ASKAREL • DRY TYPES

3 TO 3000 KVA

HILL TRANSFORMER CO., INC.

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WESTERN REPRESENTATIVES

LOS ANGELES
Maddox Sales Co.

SEATTLE and PORTLAND
Wm. O. Proby & Associates

and now...

Expanded services and facilities for Northern California customers with appointment of

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Transformers at the tip of your Telephone . . . call **Mission 8-1236**

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WEST COAST MANUFACTURERS REPRESENTATIVES WANTED. Long established prestige manufacturer of fluorescent and incandescent commercial and industrial lighting fixtures desires additional representatives to cover eleven Western states. Send complete resume including territory and other lines carried. Address Box 292, Electrical West, 68 Post St., San Francisco 4, Calif.

Hochenauer

• **G. A. "Jake" Hochenauer** is now a sales engineer for Smoot-Holman Co. in southern California. He has been in the industrial and commercial lighting field for more than 30 years, and at present is chairman of the Southern California Section of IES.

• **Appleton Electric Co.** announces the addition of a new sales division. John W. Hammond, formerly a field engineer on the West Coast, was given the duties of manager of industrial promotion with offices in Baltimore.

• **Ralph J. Davidson** has been appointed a sales representative for the heating controls division of Robertshaw-Fulton Controls Co. He will headquarter at Long Beach and serve the Pacific Southwest area. He was formerly with the customer service department of Southern California Gas Co.

• **Edmund J. Reichwein** has joined Federal Pacific Electric Co. as an apparatus engineer in the Portland branch office. He is an electrical engineering graduate of Oregon State College.

• **Herman L. Schreiner,** at one time with Sylvania Electric Products in Los Angeles, has been named product sales manager of a new retail lamp sales organization of the company.

• **Ralph T. Luciano** is appointed district representative in the Pacific District of General Electric's construction materials department. He will sell wiring devices in the Los Angeles trade area.

• **Wendell H. Neeley** is appointed a project engineer for Panellit Inc. He will work from the West Coast manufacturing plant at Alhambra.

DUTCH BRAND
FRICTION TAPE

DUTCH BRAND
VINYL COLOR TAPE

See how the Big Four in electrical insulation

MAKES ANY JOB EASIER, FASTER, BETTER

DUTCH BRAND
PLASTIC TAPE

DUTCH BRAND
RUBBER TAPE

SEND FOR THIS NEW FACT-PACKED

Big Four BOOKLET NOW!

The right tape is the *best* tape for the *best* job! So . . . you'll want to "tool up" with Dutch Brand's "Big Four" — friction tape, vinyl color tape, plastic tape and rubber tape . . . to cut installation costs.

Dutch Brand's new "Big Four" booklet describes these tapes thoroughly, tells you just what jobs tape will do, shows how "tooling up" with the proper tape can improve your electrical work . . . make jobs easier, faster and better. It's a valuable booklet worth getting . . . write for it today!

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FRANK W. WEHRHEIM—
Vice President In Charge of Sales . . .

introduces this new APPLETON Alphabet to "spell out" *the most significant program of wholesaler-manufacturer cooperation in the industry!*

APPLETON

ALDRIDGE, ELMER V.
Assistant Vice President — Sales

An outstanding sales career in the electrical industry lead to Elmer's association in 1950 with Appleton's West Coast office. In his present capacity, he assists F. W. Wehrheim in the supervision of the various sales, order, advertising, and catalog departments with emphasis on coordinating the wholesaler cooperation program.

BELL, JOHN O., JR.
Sales Manager — Unilet Division

Active in the electrical industry since 1945, John joined APPLETON in 1948 in the southwestern sales division. His impressive performance and knack of cooperating with wholesalers lead to this assignment where he heads up Unilet sales activities. John has personal, practical field experience in the sales and application of almost every item in APPLETON'S extensive Unilet Division.

CHAMBERS, JAMES R.
Sales Manager — Lighting Division

Putting at your service as fine a sales background as anyone in the industry, Jim comes to APPLETON from the position of Advertising and Sales Promotional Manager with a large manufacturer of lighting equipment. He has been extremely active in the Illuminating Engineering Society and can be of great help in suggesting the correct solution to your problems at the sales or engineering level.

DARBY, PHILLIP M.
Sales Manager—Reelite Division

A close familiarity with the details of materials handling . . . membership in the Iron and Steel Engineers Association . . . association with APPLETON dating from 1948 . . . Phil's background gives him a wealth of field experience in the electrical industry which is at your service in planning and executing your own sales campaigns.

In Booth 305 at the NAED Show

This is your team . . . a close-knit group of practical-minded, experienced sales executives APPLETON is placing at your service. Their main objectives are as simple as ABCD. In our own offices, and especially in the field, these men will form the nucleus of a valuable sales task force to help you build even greater volume for their respective APPLETON Electric divisions. Remember these names, the ABCD of friendly APPLETON cooperation . . . Aldridge, Bell, Chambers, Darby.

APPLETON Electrical Products are sold exclusively through *franchised* wholesalers.
(Effective June, 1957)

APPLETON ELECTRIC COMPANY, 1734 Wellington Ave., Chicago 13, Illinois

For Over Half a Century . . . the Standard for Better Wiring

PROFILES

High-hatted gentlemen in this scene are electrical contractors of Oakland, San Leandro, Hayward and Niles, all NECA members, who hosted a Trade Club dinner recently in San Leandro to let businessmen there know NECA contractors were Qualified to help the region to grow better . . . electrically. "Red" Farris of Ace Electric masterminded the affair. Firm names were placarded as seen here

Joseph S. Thompson, president of Federal Pacific Electric Co., receives the key to the city of Butte from Charles H. Cutter, Federal Pacific Electric district manager. Witnesses are A. W. Fox, purchasing agent, and A. L. Pollard, operating manager, Puget Sound Power & Light Co. Cutter was commissioned to present the key by Mayor Tim J. Sullivan of Butte and was directed to do it in full form. Therefore presentation was at a dinner at the Washington Athletic Club, Seattle, for Puget Power executives and their wives

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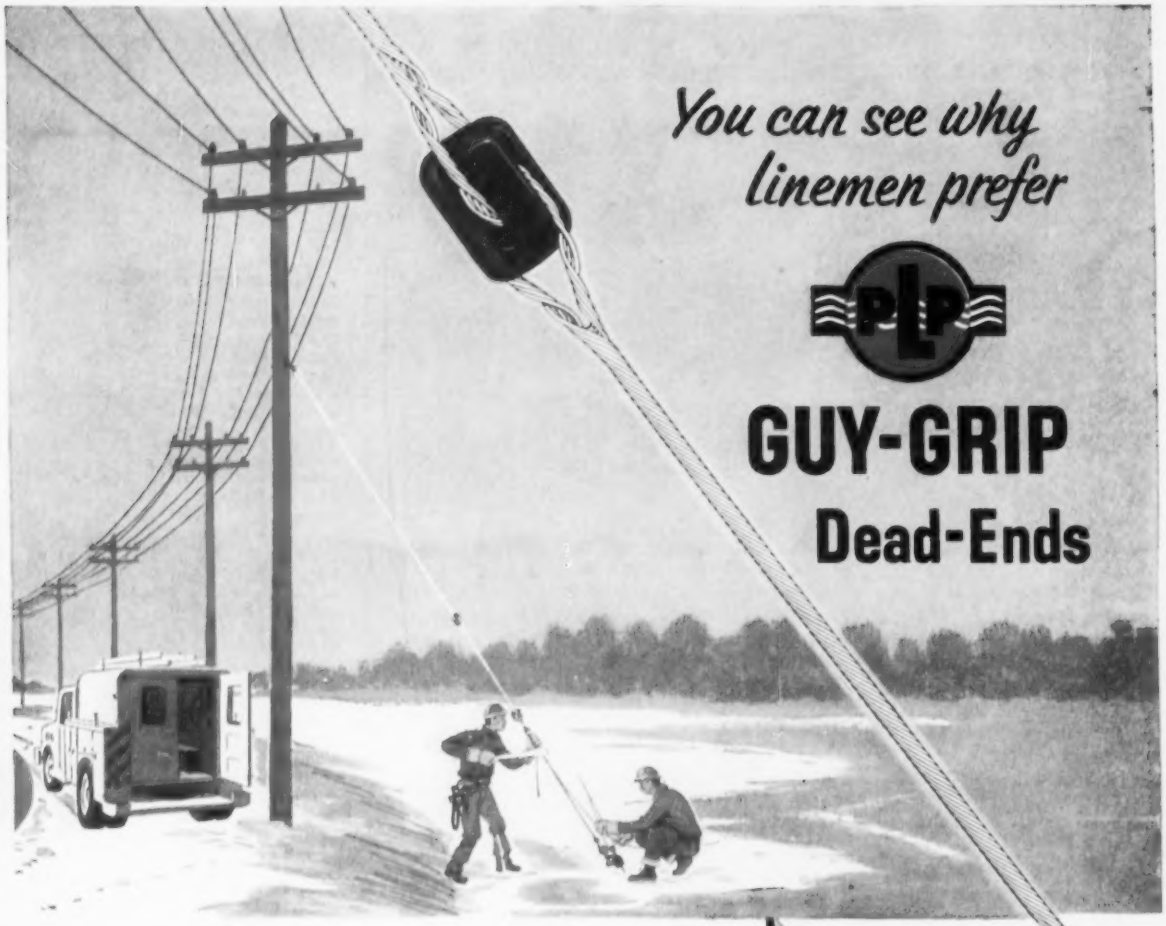

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Linemen are enthusiastic!

PLP GUY-GRIP dead-ends are the easiest, fastest and safest method yet devised for dead-ending strand.

Installation is easy because it takes just one unit, no moveable parts, no bolts or clamps to tighten. It's fast. All you do is hand-wrap the dead-end legs around the strand.

And it's safe. You can see at a glance that the installation is completed and thus secure. Linemen make better time, take pride in their work.
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PREFORMED LINE PRODUCTS CO.
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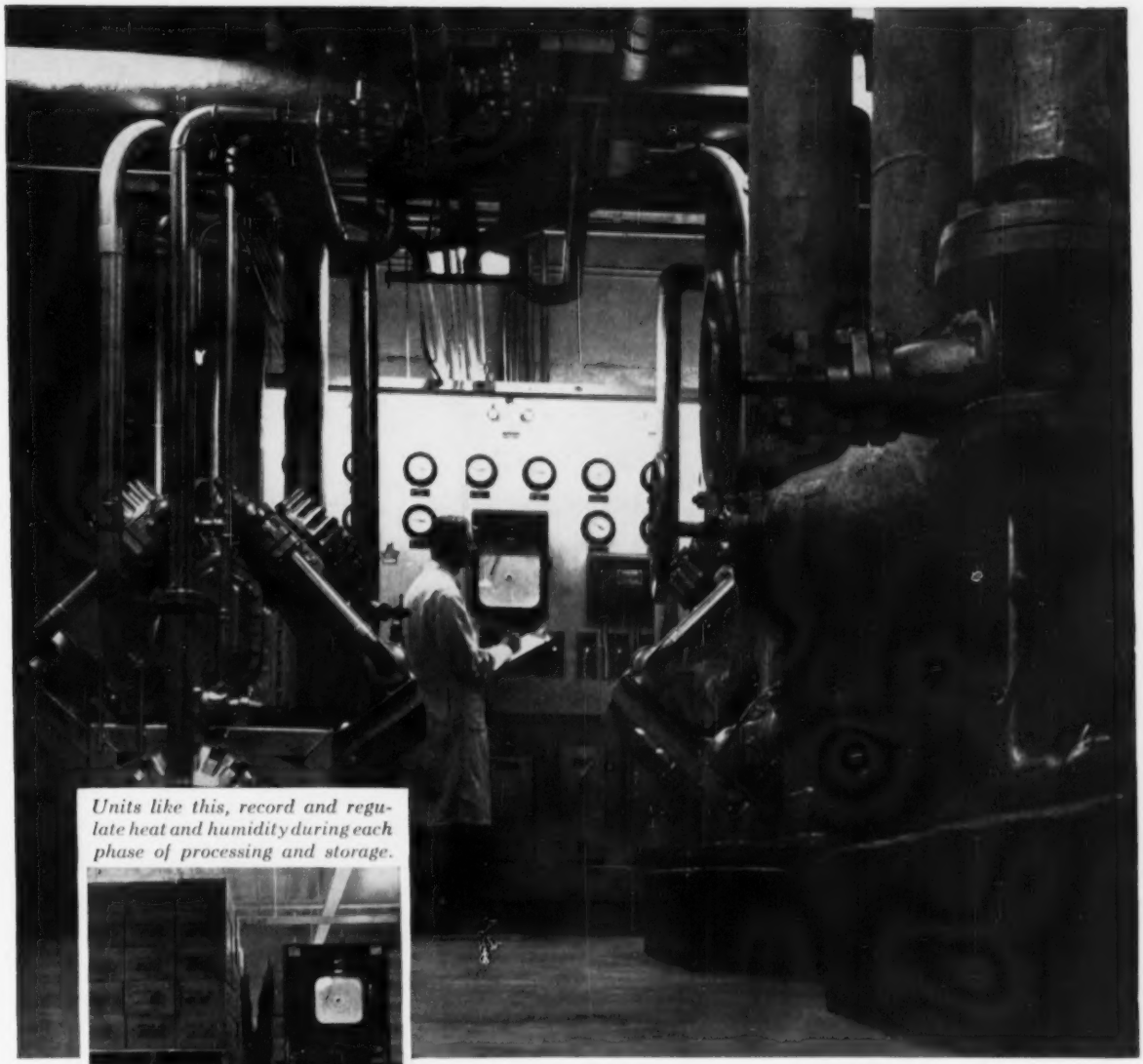
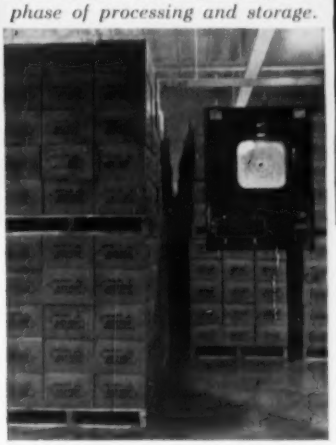
TELEPHONE CLEVELAND EXpress 1-1331

Made in accordance with or for use under U. S. Patent No. 2,761,273; other patents issued and pending.



In this room, air is washed, tempered, then distributed to Wrigley processing rooms and offices.



Units like this, record and regulate heat and humidity during each phase of processing and storage.

How air conditioning helps turn three famous Wrigley formulas into chewing pleasure

At Wrigley's spanking-new $3-million chewing gum plant at Santa Cruz, production of your favorite Wrigley brand *depends* on air conditioning!

Temperature and humidity are precisely controlled during all phases of production, maintaining the fine texture, pleasing flavor and high quality of these famous brands.

No matter what you manufacture, air conditioning can help you speed up production, cut down rejects, reduce accidents and boost employee morale.

With P. G. and E.'s low electric rates, the cost of air conditioning is a bargain. Why not ask your P. G. and E. representative how it can improve your operation?

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Pacific Gas and Electric Company

You do a lot better when you pull together

Whatever your role in this Electric Age—you have one basic selling problem: to convince others they can "Live Better... Electrically"

But you're not alone. The electric industry is investing millions to promote the "Live Better... Electrically" idea. On television. On radio. In national magazines. In newspapers all over the country. The industry will do better – and so will you – if we all pull together. Here's how:

Whenever and wherever you contact the public, promote the "Live Better... Electrically" slogan.

Feature the slogan – and the idea – in all your ads. Spread the word on your letterheads, invoices, mailing pieces and in your house organ. Your PCEA headquarters can tell you how to obtain "Live Better... Electrically" materials.

Write your PCEA headquarters today! It's just good sense – and good business.

PACIFIC COAST ELECTRICAL ASSOCIATION

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